Products finishing

HOWARD CAMPBELL, Editorial Director
FRED W. VOGEL, Managing Editor

Volume 2 | FEBRUARY, 1938 | Number 5

DON G. GARDNER
President and
General Manager

•

JOHN M. KRINGS
Advertising Manager

G. M. FILLMORE
342 Madison Ave.
New York
Murray Hill 6-3899

J. H. KOCH
431 Main St.
Cincinnati, O.
Main 0182

GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 8329

IVER W. LEE
122 East 7th St.
Los Angeles
Vandike 3916

Member

CCA

CONTENTS

Porcelain Enameling Experiences and Developments in Australia and the United States..... 7
By Fred M. Burt

World's Largest Plant for Electrodeposition.....18
By Everett R. Sterling

What Metal Cleaner Should I Use?.....23
By D. J. Benoliel

The Control of Size of Abrasive Powders.....30
By Henry R. Power

Barrel Finishing of Metal Products.....34
By H. Leroy Beaver

Practical Application of Modern Equipment.....42

The Finishing Forum.....44

Finishes that Aid in Appearance and Utility.....48

News of the Industry.....50

New Plant Equipment and Materials.....54

Index to Advertisements.....64

Published monthly and copyrighted by
Gardner Publications, Inc., Business and editorial offices 431 Main St., Cincinnati, Ohio.
More Than 14,500 Circulation This Issue

Readily Available

to provide Economies in your Polishing Department

CBT LIONITE is stocked locally in all principal industrial centers. The companies listed below carry ample stocks for your convenience.

BALTIMORE	The L. A. Benson Co.
BUFFALO	The R. C. Neal Co.
CHICAGO	The G. A. Stutz Mfg. Co.
CLEVELAND	The White Tool & Supply Co.
DAYTON	Dayton Industrial Supply Co.
DETROIT	The Udylite Company
GRAND RAPIDS	J. C. Miller Co.
KANSAS CITY	Ellfeldt Hdwe. and Mach. Supply Co.
MILWAUKEE	Cordes Supply Co.
PITTSBURGH	Somers, Fitler & Todd Co.
ST. LOUIS	Mill Supply and Mach. Co.
TORONTO	Clark Industrial Supplies
WATERBURY	Lea Manufacturing Co.

● Representatives are also located in other cities and districts throughout the United States. Names upon request.

67-106

GENERAL ABRASIVE CO., INC., 3507 Hyde Park Blvd., NIAGARA FALLS, N. Y.

Plants at Niagara Falls, N. Y. and Stamford, Ont. Mines at Berger, Ark.

Products Finishing

CINCINNATI, OHIO VOL. 2, No. 5

FEBRUARY, 1938

Porcelain Enameling Experiences and Developments in Australia and the United States

This article is the first of a series of four dealing with the interesting phases of revamping a large enameling plant.

BY FRED M. BURT

A RATHER close connection with the porcelain enameling industry for 28 years either as an active participant in its practices or in a good position as a close observer leads this writer to make the statement that in that time it has progressed from the ruck to the forefront. To be more explicit—that in 1910 if porcelain enameling were compared in its progressiveness, its efficiency, and complete daily knowledge of what it was all about with the most progressive industries of that day, it would rank far down the list. But today, the more advanced practices in porcelain enameling of every kind compare very favorably with the best industrial developments in such up-to-the-minute plants as automobile, steel, textile, and public utilities. The old traditions have been discarded and there has been a full instituting of chemical and physical controls, modern production planning, mechanizing to a full degree of ware movements, better chemicals, better enamels, better refractories and furnace and smelter designs, better burners, in fact, better everything.

This renascence can be wholly attributed to the relinquishing of the idea that porcelain enameling was

necessarily a secretive process. It has been converted into a plain out-and-out production manufacturing problem and improved by close cooperation between all concerned, even though they might be competitors. In all probability, it is unlikely that any other industry has gone more completely from one extreme to the other.

It will be attempted in this article to point out best practices, equipments, materials and others "bests", but to understand why they are so rated, the process of their evolution will be gone into in the latter portion with some explanation as to what brought about the changes.

As a concrete and practical example of improvement changes in an enameling plant, an exact description will be given of changes made in as representative a factory as can be found anywhere. This plant produces a full line of kitchenware in over a dozen finishes from one to triple coat. Sheet and cast iron (wet process) stove parts for over 3,000 gas and electric stoves per month are processed in several plain and mottled finishes, and with considerable decal and stencil work and stamped lettering. This number of stoves comprises about half of the stoves sold in Australia. Another part of the work is devoted to 300 to 2,000 signs weekly including house numbers, auto tags (One tag is bought from the state for the front end of the car; the other is bought independently, generally through the auto dealer or auto club. The tags do not have to match except as to number. They are not dated and are used longer than a year though the tax is yearly. In this division, four-hour service on single orders was developed.)' Grave markers, railway semaphores, up to 4 ft. x 8 ft. diameter double face multi-color signs, silk screen signs with up to nine colors and shades, signs with 11 firings, refrigerator linings and casings for stock domestic electric and ice refrigerators, special commercial refrigerator work, hospitalware, acid resistant laboratory and hospital equipment, acid resistant tanks up to 3 ft. diameter x 6 ft. high, table tops, electric iron tops, trays, wall tile, dishwashers, and checker boards. Almost along side this production was a complete sanitaryware plant making a very full line of bathtubs, sinks, and so on, with over a dozen finishes and dozens of sizes and designs. Four furnaces and three smelters were turning out over half the country's sanitaryware. In order to produce all this work, the largest foundry in the southern hemisphere was provided.

This enameling plant

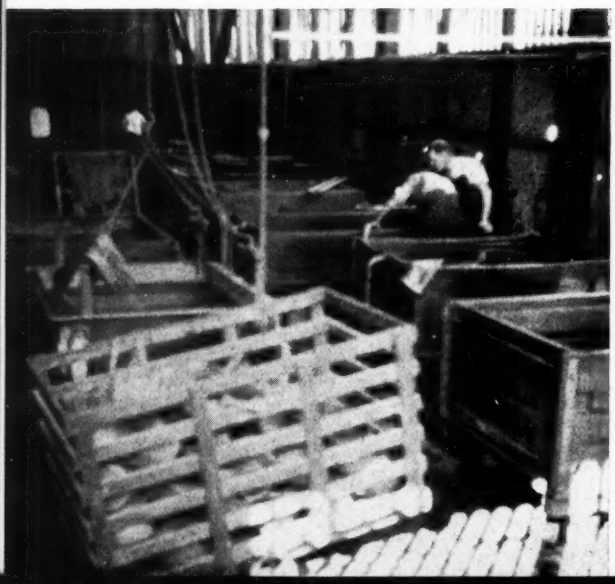


Fig. 1—A view of the pickle room before the entire enameling department was revamped.

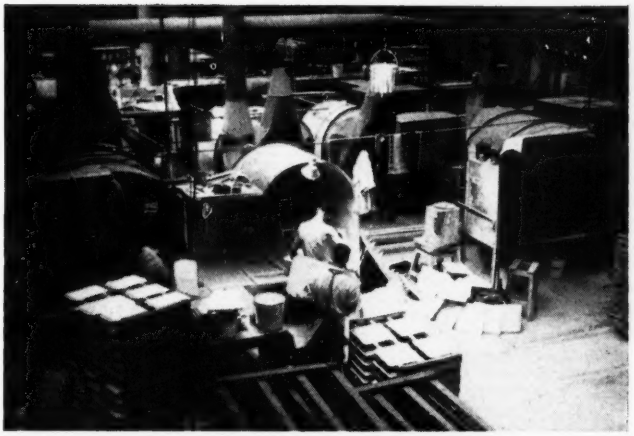


Fig. 2 — Department in which the spray booths for stove parts and signs were located before revamping.

▼

was admittedly (particularly the sheet iron end) quite far behind the times and the writer had to do with correcting this condition, with the handicaps coming from being in a far and strange land but with the decided advantage of very liberal financial support and as full authority as was reasonable.

As is always called for when such problems present themselves there is first the necessity to Visualize—Organize—Deputize—Supervise. Without doing these in a logical manner to a high degree an executive is almost certain to be swamped.

To present these activities in a systematic outlined form with the following Production Analysis outline will be followed. This was developed from an outline given in a paper by Stewart M. Lowry, Industrial Engineer, The Procter & Gamble Co., at the Second Annual Conference on Management Problems of the Smaller Industries at Silver Bay. The writer prizes this outline rather highly as representing information to be had of necessity, and improvements to be made, by factory managements (enameling and other) if they wish to know the true state of affairs, to arrive at a genuine state of efficiency, and to keep on top of the job rather than the job bouncing them around like an Australian surf "dumper" tosses a luckless one about. It is unlikely that anyone can quarrel with or find non-essentials in this outline, yet it is just as unlikely that even a majority of manufacturers have this knowledge fully; or having it concentrated in one, two or even three executives that it might have coordinated value.

1. Operations—(a) What are major operations, their sequence, and how do they fit into the complete manufacturing process?

(b) Show on combined flow sheet and personnel chart.

2. Equipment—(a) — List machinery and equipment with capacities, speeds, applications, and other pertinent data.

(b) Have same shown (major units at least) in proper detail on blue prints (drawings) of complete plant layout.

(c) Is it modern, efficient, and in good condition?

(d) What system of planned and recorded maintenance is used, if any. Remedy any deficiencies.

(e) Is it properly laid out for best production flow?

(f) What is the condition of transportation between operations?

(g) What equipment constitutes bottle-neck, if any?

(h) What are anticipated breakdown danger points to prevent stoppage of production?

3. Raw Materials—(a)—What materials in what form? From where?

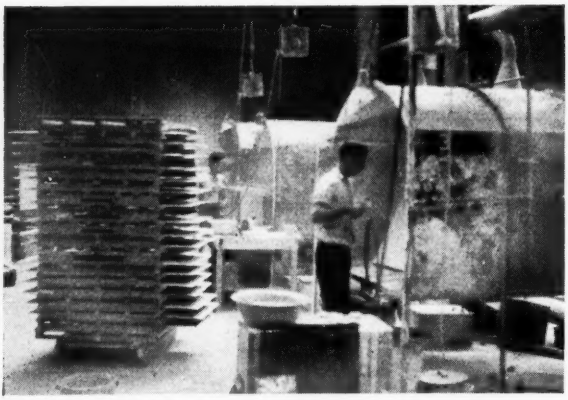


Fig. 3—These spray booths were furnished by a Sydney representative of The DeVilbiss Company.

How received and stored? Storage capacities? How handled?

(b) What positive provision made, if any, to prevent material shortage from interrupting production?

(c) Is full value received from all materials bought?

(d) What are wastes and how saved?

(e) What are wastes and how saved on accessory supplies?

4. Products—and their relation to orders and production system.

(a) List items and their finishes.

(b) How are orders and anticipated needs translated into production orders?

(c) What provision is made for fully coordinated production flow, if any?

(d) Under one control and combined record, or several?

(e) Determine shortest possible production cycle, each unit.

(f) How many special rush orders? Detail on same.

(g) To what extent is it possible to eliminate storage build-up of units in process between operations?

(h) List storage and handling accessories. Would others be of advantage?

(i) How are products stored, packed and shipped?

5. Personnel — (a) Make up organization chart showing departmental organization with detail of personnel.

(b) What are individual duties? Any unnecessary over-lapping?

(c) What are working hours, shifts, direct and indirect labor?

(d) Where are operations on wage incentive basis? What kind? Should others be placed in this classification?

(e) What cost and production standards have been set up through time and motion study? Remedy deficiencies in same where needed.

(f) Is direct, productive labor fully serviced (or over-serviced) with indirect (service) labor, materials, equipment, accessories?

6. Operating Costs—(a) What are existing unit costs?

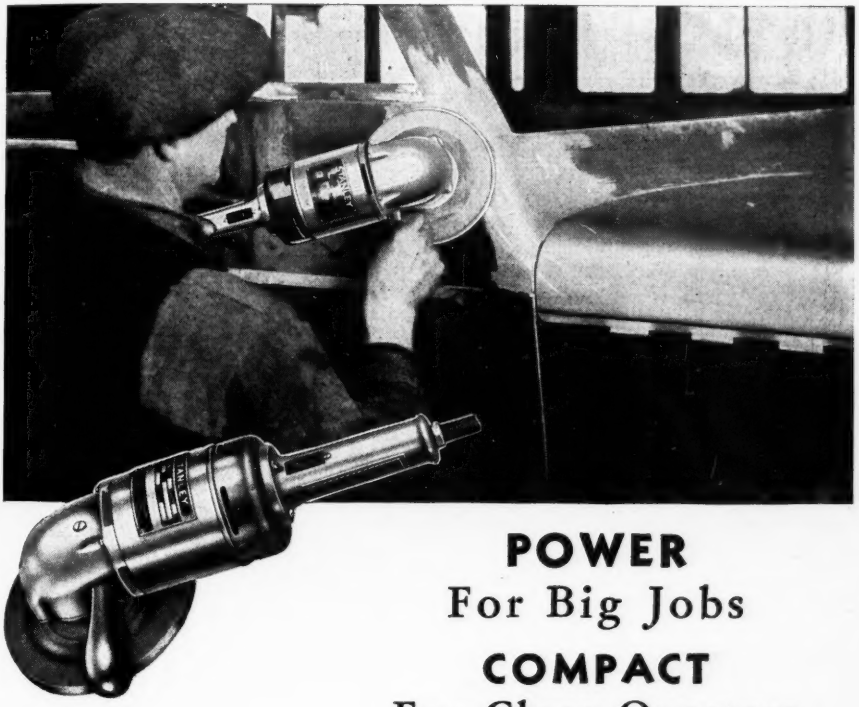
(b) If none available, how can they be determined?

(c) Do supervisors know these costs and can they control same?

(d) What are the sources of waste and scrap losses and how controllable are they?

7. Production Loads—(a) What is the fluctuation in production loads?

(b) How far in advance are they scheduled and by whom?



POWER
For Big Jobs
COMPACT
For Close Quarters

STANLEY No. 77 ELECTRIC DISC SANDER

A powerful motor, long life gears and free-running ball bearings throughout equip this new 7" Stanley Disc Sander to handle the biggest production jobs in your shop. Compact streamline design makes it easy to use in close quarters. Ask your Stanley distributor for a free demonstration, or write for folder.

STANLEY ELECTRIC TOOL DIVISION
The Stanley Works, New Britain, Conn.

STANLEY STANLEY **ELECTRIC TOOLS**
A Complete Line for Industry — "Cost Less Per Year"

(c) What planning methods are employed by supervision to anticipate requirements and to use materials, equipment, and personnel most effectively?

(d) What relation is there between production for stock and current orders?

(e) What are the normal requirements and what are the most economical runs possible (in relation to requirements) between equipment set-up changes?

8. Plant Good Housekeeping — Safety—Sanitation.

(a) Is there systematized maintenance of organized order?

(b) Is there a place for everything and is everything kept in its place?

(c) Is there a full complement of all accessory gadgets on each operation? Proper waste receptacles? Well planned lighting?

(d) Are there all necessary safety appliances, safeguards, signs, first aid provisions?

(e) Are there proper locker, sanitary, and cleaning provisions?

(f) Are there proper storage conveniences, properly placed for all equipment and materials, both temporary and reserve, with efficient transportation?

(g) Is there a scheduled cleaning up of wastes and accumulations closely tied up with salvage operations?

9. Miscellaneous — (a) What are the quality standards? Checked by whom?

(b) What are facilities for accurate controls? Whose specific responsibilities?

(c) What working standards and specifications are available for reference and employee instruction?

(d) What combined planning is there between production and control supervisors?

(e) What exact cost and control record is kept?

(f) Any production, cost, consumption, quality percentage, waste, salvage or other graphs kept for daily or other periodical comparisons?

Fig. 4—This illustration shows an enamel tank equipped with a demountable hood.

Having done this type of work in a number of factories, enameling and other, the concrete examples given here may not all be confined to operations in the Australian plants, Metters, Ltd., Sydney and Melbourne, and if a better illustration can come from an American factory, it will be so stated.

1. Operations—The main points of operation are very familiar to an experienced porcelain enameling production man and in going into a new factory are quickly recognizable—(confining this to sheet iron enameling)—the taking of the fabricated parts and removal of the grease by heat or a detergent, the pickling, neutralizing, rinsing, drying, enamel application by spraying, dipping, draining, drying, burning, more application,

drying, burning, various decoratings possibly, making and preparing of the enamel for application, and so on. In observing how these operations were carried out in this plant, it was very evident that drastic changes would have to be made throughout.

The pickle room, as shown in Fig. 1, was of the old hand-operated, piece by piece, set-up, using cold muriatic acid. This room was also about 100 yards from the point where the ground coat was applied. Item 1 called for the installation of a complete new pickle room in a more convenient location, and using not over 25 per cent as many man-hours for the same production and also the elimination of from 16 to 24 furnace hours (2 and 3 man crew) for grease-firing by using a hot detergent. (Two tons of the latter two brands were immediately ordered from the U. S. A. that it might be available when the new pickle room was installed—incidentally costing, with duty, about 1 shilling (20 cents) per pound delivered to the plant. Doing it over again, the writer would likely take the available chemicals as per following formula and save much money and get as good results. The chemicals for this formula are as follows: 30 per cent caustic soda, 35 per cent trisodium phosphate, 25 per cent soda ash and 10 per cent resinate or cottonseed soap.) The department in which spray booths for stove parts and signs were located is shown in Fig. 2.

In the application of enamel, the spraying was quite efficient with new DeVilbiss equipment furnished by a live wire Sydney representative with a good stock and with good booths as shown in Fig. 3.

(b)—A flow sheet was developed as changes were made and the personnel was listed with classifications, duties, daily productions (where possible) and weekly report on payroll individually and as to classifications. All this information was compiled for general supervisory guidance.

2. Equipment—(a) As rapidly as possible all the detailed data available on every item of equipment, accessory items, repair items, materials and supplies were accumulated for analysis and,

Fig. 5—One of the old hand-carried racks in use to convey workpieces before the entire shop was revamped.

(b) in preparation for enlarging, rearranging, and re-equipping, a detailed drawing was made of the entire enameling department, blueprinted, and all major units marked in with red and yellow pencils. Then as each change was contemplated the writer marked in all changes on a similar blue print showing new locations with exact dimensions. This blue print was taken out on the floor by a draftsman and a helper who chalked on the floor the exact new locations for the equipment that was to be re-located. Every piece of equipment, doorway, passageway, and storage or operating space had been previously marked with a permanent identifying number or letter for convenience. These were also noted on the floor which direction the unit

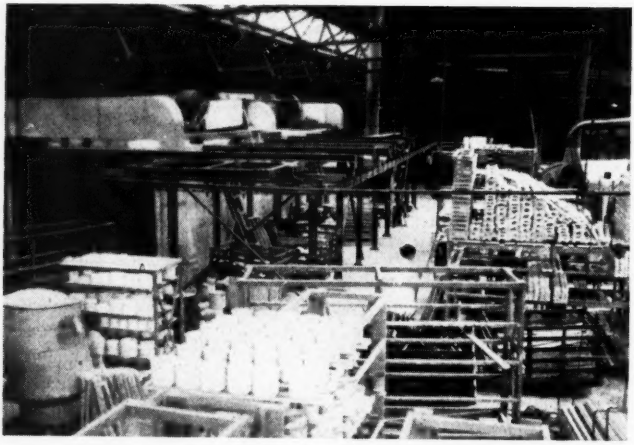


Fig. 6 — Illustration showing general view of shop and new rubber-tired, roller-bearing wheel racks.

was to face. When the changeover was made there was no excuse for any mistakes or wasting of time. By this method of planning, a very few men in 3 or 4 hours changed the entire layout of the entire enameling department. The writer is certain, from having done it very many times, that operating layouts can best be planned on a drawing table with such a blue print, along with an occasional reference glance over the field of action, rather than going out on the floor and pointing out how changes should be made and doing the planning at that time. The very best possible layout can be doped out and changes made exactly to that plan with just one move. From detailed observations in 168 enameling factories and divisions in the past eight years the writer is certain that the great majority of layouts are the product of piecemeal additions without comprehensive, advance planning.

If a company has any idea of making additions and future changes, even though only a little at a time, the whole thing should be planned and detailed on drawings to cover all improvements anticipated for from two to five years to come, then any changes made would be part of the planned entity. This plan should then be kept up-to-date in the light of the experience and developments of others. Such work costs a little money but never fails to pay for itself several times over. Only a rather small percentage of enameling (and other) plants have up-to-date drawings properly filled in with pertinent data, yet, it is unlikely that there are any cases where it would not be a very good investment.

(c) This plant produced most of the kitchenware made in Australia. The application of the enamel was made in very large tanks around the wall, with two or more dippers (swillers) at each tank. Over the tank was a canopy to catch the dust, and it had caught plenty. This dust was found to be half an inch or more thick. The tanks were immediately replaced by single tanks to segregate the workers, thus giving greater convenience and cleanliness and at the same time providing a unit which was easily movable to new locations. The tanks were made in the sheet metal department and consisted of wooden framework, an enamel tank and demountable hood. A view of one of these units is shown in Fig. 4. Each dipper was also equipped with service tables of exactly the right height and size, a full set of tongs to replace inefficient hand-dipping, and a helper to service

and sponge the ware so that a dipper could stay at dipping.

The ware traveled from the dippers to the dry room which was located between the furnaces. Illustrated in Fig. 5 is one of the 160 or more hand-carried racks which were replaced as soon as possible by 70 ten foot racks, several of which can be seen in Fig. 6, mounted on rubber-tired, roller-bearing wheels. One set of wheels was fixed and the other swiveled. Provision was made for extra side strips to hold more layers of ware when flat work-pieces were processed.

The dry room would not accommodate the new racks, consequently, a continuous dryer was indicated. In the middle of the floor was an office and stencil room, as shown in Fig. 7. These rooms occupied the most valuable operating space. In the corner beyond was a women's wash room occupying four times the necessary space and next to the wash room a room containing two spray booths, both inconveniently located. The latter space was immediately converted into a modern rest room and stencil room with a vast accumulation of old stencils being properly cataloged and filed away in an easily accessible but out-of-the-way spot. The old wash room was made into a well-appointed office and laboratory. The continuous dryer was built down through the middle of the floor as shown in the illustration, Fig. 8. The view in Fig. 8 is the same as in Fig. 7, when the dryer was nearly completed. The furnaces were about 60 ft. to the right of the end of the dryer and in a line at right angles.

In the foreground of Fig. 7 is shown a man brushing a stove part to show the black edge. The enamel was brushed off on the floor and later swept up. The plain tables were replaced immediately by modern brushing tables with exhaust fans, turntables, grating tops, and latest modern accessories.

The smelters were old and of small (500 lb.) capacity. A new double smelter of up to 1600-lb. batch capacity on each side was designed and built. The burners in the smelters were located on the side opposite the stack. Space was left here so that the burners could be installed if another firing arrangement was unsatisfactory but was later filled up. As finally built, one side had the burner beside the flue so that the flame and products of combustion would travel across the batch and return to the flue thereby gaining a double value of heat input. The other side had a burner in the center and a flue on each side at the same end. The large smelter cut the smelter loss (difference between batch and frit

Fig. 7—The man in the foreground is shown brushing a stove part to show the black edge.

weights) from the 20 per cent in the old smelters, to 13.5 per cent. This had to be considered since the production of frit amounted to 100,000 to 130,000 lbs. per month. In addition, two 150-lb. capacity steel-cased, experimental smelters were built.

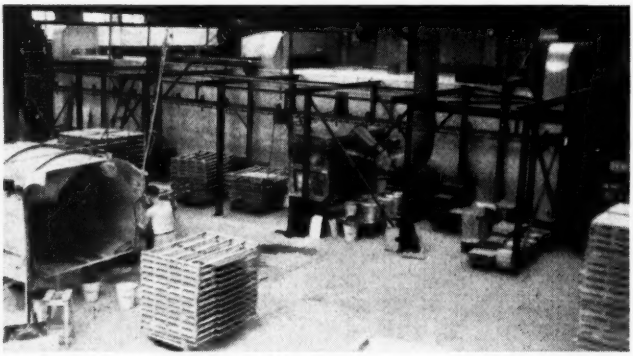


Fig. 8—This view is the same as Fig. 7 when the dryer was nearly completed.

The furnaces were found to be in rather bad shape, improperly located, and of a poor design. The old ones were rebuilt with plans laid for relocating as soon as possible, and two new ones were authorized. The second one of these were designed by the writer to incorporate a rather radical new principle in box type furnaces. The idea of using the cubic content of the furnace to its fullest extent, and to provide for hanging the ware from special alloy hooks fastened in holes in angles resting on ledges running from the front to back of the furnace at the top of the side wall. The angle bars were made of strips of Poldi steel 1½ in. x ¼ in. welded together and 4 ft. 9 in. long. The greater part of the 48 in. height from the furnace hearth to the bottom of the angle bars could be filled with ware. The space usually occupied by a grate which rests on the hearth is saved and the relation between the weights of tooling and ware to be burned is reversed. Instead of using 350 lbs. of tooling for 80 lbs. of ware 200 lbs. of tooling would handle 500 lbs. of ware and the greater amount of the heat produced would go into productive burning rather than losing it in heating of tooling. With this procedure, there is no heavy tooling next to the ware to cause underburned spots.

An overhead fork, manually operated, brings the suspended ware out of the furnace over a floor on which there is no track or trucking impediment so that trucks can be located actually under the ware to be unloaded. In actual operation, two overhead forks are used after the fashion of other orthodox double speed forks. The forks can be linked together or handled separately. This type of furnace will handle more ware for the same hearth space and fuel consumption than any other, and will more closely approach continuous furnace production. It does call, however, for more operators. Three or four men are required to properly service it but the resulting production has been found more than proportionately higher.

The Color Question. Very carefully compiled information has been printed in booklet form regarding coloring in porcelain enameling and is now being issued by Ferro Enamel Corporation, 4150 East 56th St., Cleveland, Ohio. Several pages of this booklet are devoted to questions and answers on coloring oxides. A copy of "The Color Question" will be sent free upon request.

UDYLITE BRIGHT NICKEL PLATING PROCESS

Bright, Ductile Deposits Direct from the Bath

Finishing costs are reduced to a minimum. . . . Small parts require no nickel buffing; some large parts need light coloring only. . . . No copper buffing. . . . Cut-through rejects are eliminated. . . . The smooth, ductile nickel coating does not flake or peel.

Stable, Efficient, Easily-Controlled Plating Solution with Good Throwing Power

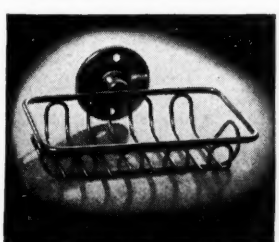
The ingredients of the solution do not decompose to produce undesirable products. . . . The bath operates at an efficiency of 98 per cent. . . . Highly lustrous nickel deposits are obtained over a wide range of plating conditions.

Udylite Service

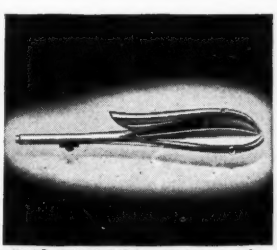
As for other plating processes, Udylite realizes the value of service. Therefore, specially trained engineers install The Udylite Bright Nickel Process and instruct the plating operators thoroughly before the installation is turned over to them.

* * *

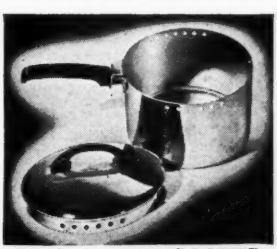
For full information on The Udylite Process of Bright Nickel Plating, get in touch with the nearest Udylite office. *The Udylite Company, 1651 E. Grand Blvd., Detroit, Michigan—New York,* 30 E. 42nd Street; *Chicago,* 1943 Walnut Street; *Cleveland,* 3756 Carnegie Avenue; *San Francisco.* 114 Sansome Street.



FINISHING MADE EASY— This inexpensive wire soap dish is copper flashed and bright nickel plated directly on unburnished steel. The finishing operations are simple and ECONOMICAL.



50% SAVINGS—This part is buffed, copper plated (no copper buffing), bright nickel plated, light nickel wiped, then chromium plated. Elimination of operations means large direct savings.



GOOD THROWING POWER —This saucepan (8 in. dia. x 5 in. deep) is flashed with copper, then bright nickel plated. The Udylite solution deposits a bright, even coating on entire inner surface.

World's Largest Automatic Plant for Electrodeposition

By Everett R. Sterling

ACCORDING to Messrs. W. Canning & Co., Ltd., the world's largest automatic plant for electrodeposition has been designed and erected in Birmingham for the Birmingham Bicycle Manufacturers Messrs. Hercules Cycle & Motor Co., Ltd. The equipment was designed for nickel and chromium plating the steel parts of Hercules Cycles. The installation is constructed in two sections, the nickel plating section being 142 ft. in length and the chromium plating section 103 ft., making a total length of 245 ft. in addition to the loading bays.

Fig. 1 shows a view of the complete plating installation. At the left of this illustration, a workman can be seen loading workracks or cathode suspenders onto the special attachments of the conveyor chains of the nickel plating unit. The loaded workracks are lifted from this position into the electroalkaline cleaner tank. An electrically controlled panel is situated at the right of the loading platform in the most convenient position for the operator.

In the electroalkaline cleaner tank, the articles are subjected to electrolytic cleaning in a hot metal cleaning solution. The solution is continuously agitated by compressed air, and a second air service keeps the surface of the solution clean by forcing scum and dirt to one end of the tank where it is automatically removed.

After the parts have been subjected to the alkaline cleaner they are again

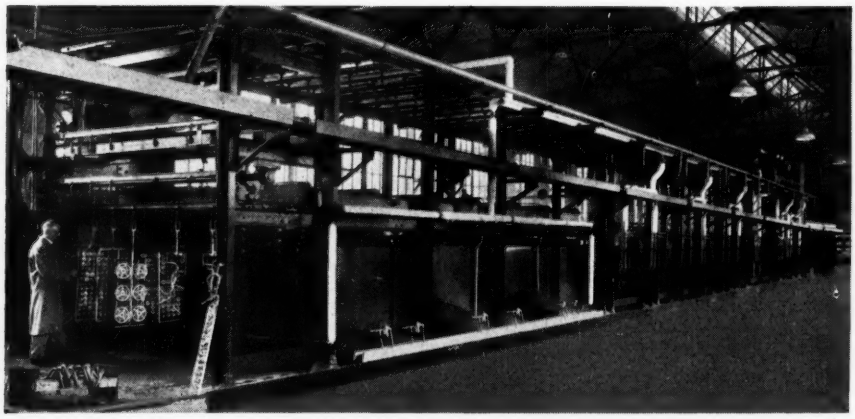


Fig. 1—View of a completely automatic nickel plating unit which is 142 ft. in length. A workman is shown hanging racked pieces on the hooks of the moving conveyor.

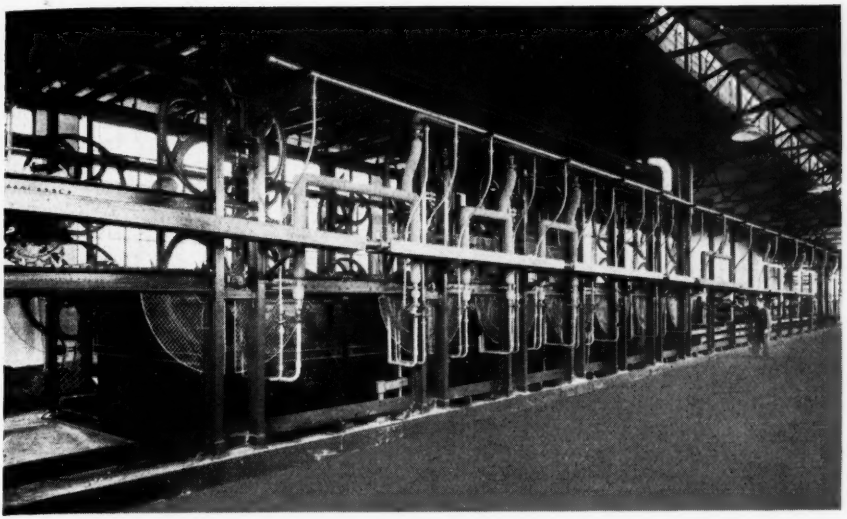


Fig. 2—View of a 103 ft. completely automatic chromium plating unit. This unit is continuous with the nickel plating unit shown in Fig. 1. All necessary precautions are taken to remove harmful fumes from the plating tanks.

lifted out by means of special attachments on the conveyor chains and "towers," and are lowered into a hot water rinse. This rinse is agitated and the surface cleared in a similar manner to that of the electroalkaline cleaner.

The racked workpieces are next passed to an electrolytic acid bath where they are finally made ready to receive the nickel plate. It is first necessary, however, to insure that no trace of acid remains in any of the hollows or crevices of the articles, consequently, two cold rinses are interposed for this purpose. The rinses are separate, thus the workpieces must be lifted clear of the first and then lowered into the second tank by the conveying apparatus.

The nickel plating is next in line. The length of time required for the workpieces to be subjected to this solution depends upon the type of the article. Exact timing insures a perfect coating of nickel of uniform thickness with no loss of time. The nickel plating tank is equipped with all the required electrical connections in order to carry the large current necessary. Air agitation and warming of the solution are provided, the latter being necessary to permit the use of relatively high current densities.

Following nickel plating, the workpieces are subjected to a cold and a hot water rinse. The purpose of the latter rinse is to bring the workpieces up to a reasonably high temperature before passing them into a drying oven, which is the final process in the nickel plating section of the plant.

A special filtration operation is operated in conjunction with the nickel plating tank. The overhead pipe line running the length of the tank carries the nickel solution to the filter unit. The nickel solution is filtered by pumping through filter presses into a storage tank, from whence it is returned by gravity to the nickel

plating tank. The filter presses and storage tanks are situated close to the loading platform of the nickel plating unit. The storage vat is of sufficient capacity to hold the full volume of solution in the nickel tank, so that this tank may be periodically emptied and cleaned. The requirements of this plating set-up are such that emptying and cleaning must be done each week.

The workpieces which are still hung on the nickel plating racks or suspenders are transferred to the loading platform of the chromium plating tank where they are immediately passed into the chromium plating tank. Fig. 2 shows the chromium plating tank. This plating tank is continuous with the nickel plating tank but the combined length of the two is too great to permit showing together. The chromium plating tank is constructed of iron and lined with special hard lead and again lined with reinforced glass sheets. It is enclosed in a water jacketed tank for heating by steam. Fume exhaust ducts surround the surface of the plating solution, and fumes are drawn into the expansion chambers and discharged into the open air by means of two fume discharge ducts located above the tank. Below the expansion chambers are placed tanks for the recovery of the solution. An air agitated coil is placed in the bottom of the chromium plating tank so that the solution can be agitated when necessary, as when operations have been suspended such as overnight.

The "drag-out" which follows is for the purpose of rinsing the articles in hot water to remove chromic acid. The workpieces are then subjected to a cold water rinse to further clean

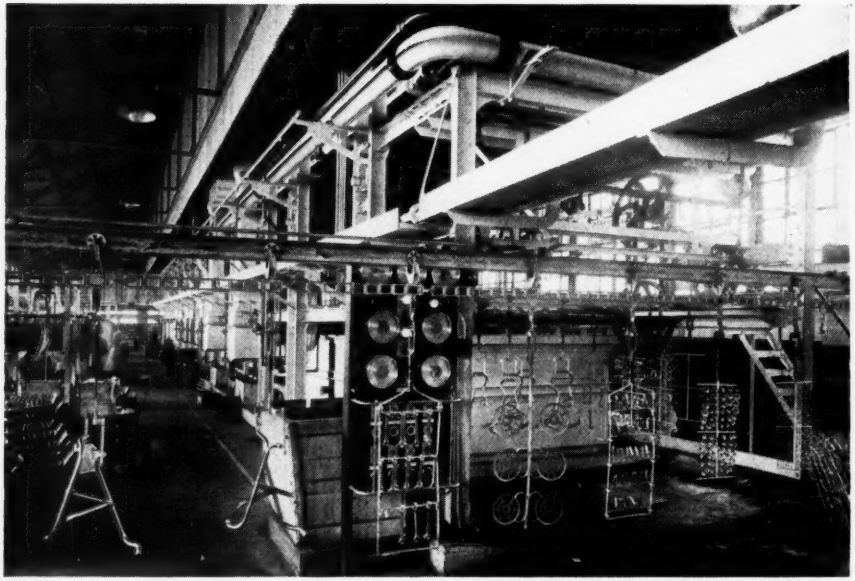
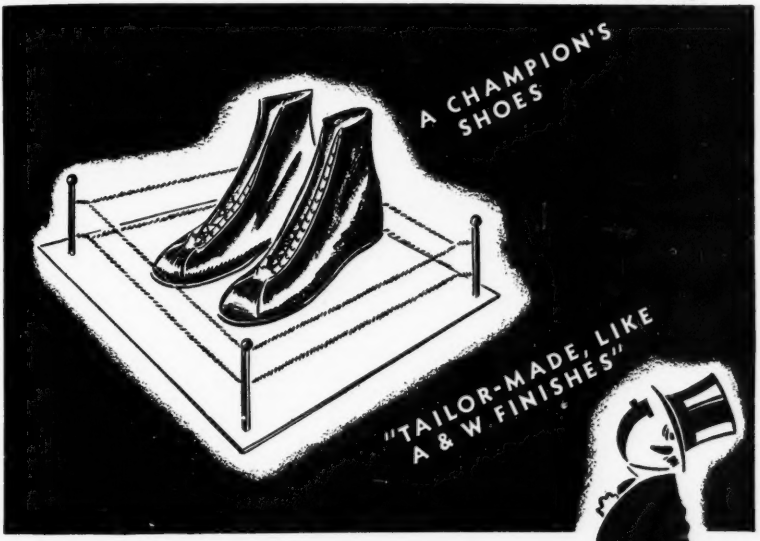


Fig. 3—Another view of the plating plant in which bicycle parts are plated for the Messrs. Hercules Cycle & Motor Co., Ltd.

BUILT TO EXACT SPECIFICATIONS



Naturally, the champions of the ring do not choose their fighting shoes at random . . . out of stock. Too much depends on fast footwork to risk improper fit. Their shoes are custom-built . . . "tailor-made" to fit exactly.

A & W builds Industrial Finishes with the same exacting care. Each finish is designed to do an individual job . . . and do it best. And the result to the manufacturer is more salable, more attractive merchandise, and lower production costs. A & W "Tailor-Made" finishes uniformly give greater coverage, speed up production, eliminate excessive rejects, reduce labor costs.

Call in the A & W representative. From his study of your product and manufacturing processes, the A & W laboratories will be enabled to produce a finish built to your exact needs . . . "Tailor-Made" for the job.

AULT & WIBORG CORPORATION

NEW YORK, N.Y. CINCINNATI, OHIO

In Canada—Aircraft Paints, Limited, Toronto

Builders of Fine Industrial Finishes

them, and then a neutralizing tank follows in which any acid remaining is neutralized. The cold and hot water rinses following the neutralizer tend to condition the articles before passage through a drying oven. The completion of the plating process is accomplished after the workpieces have passed through the drying oven.

H-VW-M Solution Analysis Booklet. A paper bound, 24-page booklet, 4 in. x6 in., containing methods of analyzing plating solutions in practical operations, is now being issued by Hanson-Van Winkle-Munning Company, Matawan, N. J. The Table of Contents includes the following subjects: Principles Involved in Analysis: the Use of Apparatus; Methods of Sampling a Plating Solution; Methods of Analysis of Nickel and Black Nickel (metal, chlorides, pH, sulphocyanide), Silver and Gold (metal, free sodium or potassium cyanide), Copper and Brass (metal, sulphuric acid, copper sulphate, free sodium cyanide). Zinc (metal, cyanide, sodium hydroxide, sulphuric acid to be added), Carbonates in Cyanide Solutions, Chromium (chromic acid, sulphate), Tin (metal, sodium hydroxide), and Cadmium (metal, sodium hydroxide, total and free cyanide). Copies may be obtained by writing Hanson-Van Winkle-Munning Company, Matwan, N. J.

Manual of Porcelain Enameling. The Enamelist Publishing Company, 4150 E. 56th St., Cleveland, Ohio, has announced the publishing of "A Manual of Porcelain Enameling". This manual is edited by J. E. Hansen, service director of the Ferro Enamel Corporation, and contains 520 pages of up-to-the-minute technical and practical information on all phases of porcelain enameling. Its two dozen chapters, each the work of a specialist who has devoted many years to the problems under discussion, present intelligent and comprehensive answers to practically every pertinent question anyone could ask about porcelain enamels and enameling processes.

The new volume makes use of some material from its predecessor, "The Advanced Technique of Porcelain Enameling", also edited by Mr. Hansen and published five years ago. Most of the new text is brand new, which has been made necessary by the many recent developments and improvements in the industry. At the back of the manual are tables of useful data and an Enameler's Dictionary, a complete glossary of the technical jargon of laboratory, smelter, mill room and furnace room. A few of the chapter headings are as follows: History of the Art; Design and Fabrication of Sheet Iron Parts; Cast Iron for Enameling Purposes; Preparation of Metal Surfaces; Enamel Mill Room Practice; Mill Additions; Water and Air Supplies for Enameling Plants; Application of Enamel; Drying; Brushing; Enameling of Signs; Enameling of Hollow Ware; Burning; Inspection; Decorative Effects; Shop Troubles; Process Control; Muffle Furnace Atmosphere and Temperature Gradient Effects; Fuels and Their Combustion; Enamel Shop Construction, Equipment and Layout.

Copies of "A Manual of Porcelain Enameling" are available at $5.00 each.

"Modern pH and Chlorine Control". This is the title of a 66-page book which is now being issued by W. A. Taylor & Company, Inc., 872 Linden Ave., Baltimore, Md. According to the publisher, the principal purpose of this book is to render the greatest possible service to everyone interested in pH, chlorine and phosphate control and in water analysis. In addition to a list of modern and practical equipment, the book contains considerable practical information collected by a staff of competent researchers over a period of fourteen years of specialization in work of this type.

The purpose of the first section of the book is to explain the meaning of pH control in such simple terms that it can be clearly understood and accurately applied even by those who have little or no technical training. The second section gives a theoretical discussion of pH. This is followed by the application of pH control to various processes and descriptions of equipment for making pH determinations. Finally, a discussion of chlorination and chlorine control equipment is given.

A copy of "Modern pH and Chlorine Control" can be obtained by writing W. A. Taylor & Company, Inc., 872 Linden Ave., Baltimore, Md.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

What Metal Cleaner Should I Use?

Herewith is Presented an Outline of Fundamentals in Choosing the Proper Cleaning Chemical

By D. J. Benoliel

General Manager, Quaker Chemical Products Corporation, Conshohocken, Pa.

THOUSANDS of words have been printed giving in great detail metal cleaning processes and equipment, but very little, if anything, has been written to assist the poor production man in choosing the proper cleaning compound for his particular problem. In preparing any metal for any finishing operation it is not so necessary to have the surface what many people loosely term "clean," but it is necessary to leave the surface free from any foreign materials or chemicals that would interfere with the subsequent finishing process.

Some surfaces should have an alkaline film on them, others an acid film, others should be neutral, and in some cases, yea verily, a slight oil film is of distinct benefit. Let us now investigate what to look for and what to avoid in choosing the proper chemical to prepare metal for each individual finishing process.

Time has proven that the most reliable, most elastic and cheapest method of cleaning is with a water solution, or emulsion of chemical, or oil, that is to say, alkaline cleanser or water emulsifiable solvent. For the purposes of this discussion, we will limit ourselves to two practical methods that find general use — alkaline and water soluble solvent cleaning.

Electroplating

At the outset, we must agree that there can be no "best plater's cleaner." There are too many ramifications in plating. Let us now list the main plating cycles and find out what to look for in the proper cleaner.

Cleaning Steel Before Copper, Nickel and Chrome Plating Cycle

Where a complete automatic plating system is used together with a bright nickel, there are no complications due to buffing. In a cycle such as this, the only really difficult cleaning is the removal of the cutting down compound from the steel before it goes into the first cyanide copper. In this particular plating cycle, a full automatic is more or less standard procedure. Electric current is utilized. A metal cleaner running somewhere between 35 to 50 per cent of caustic soda, the balance being silicate and phosphate should be used. No soap should be present as this interferes with the conductivity of the solution and an excess of soap will lead to trouble if dragged through the plating cycle. Some of the new silicates on the market that run high in Na_2O will be even better than a compounded mix of caustic, silicate and trisodium. However, it is quite important that the Na_2O content be high enough to give the equivalent of around a 45 per cent caustic soda cleaner.

It is understood that this cleaner is to be used on the steel before copper

plating. After the work goes through the copper and bright nickel, providing there is no polishing, the work can be run through a much weaker solution of the same cleaning compound and then into the chrome. Incidentally, in this discussion we are not going into the cycle of rinses, acid, and cyanide dips, as it is assumed this regular procedure is known to all production men.

Let us now consider the plating cycle where the copper is polished before nickel plating. The same cleaning compound can be used here before copper plating as in the complete automatic. However, the polished copper must be handled differently. If the buffing composition used is high in saponifiables, the work can frequently be cleaned satisfactorily in an electric bath. In this case, a material should be used with approximately 20 per cent caustic soda, the balance being silicates and phosphate, properly buffed so there will be no tarnishing. Here, soap is frequently necessary to wet-out the metal. However, no more than 1 per cent of soap should be used on an anhydrous basis since more is almost certain to cause trouble.

Where the buffing composition is not high in saponifiables, or where conditions make it impractical or impossible to clean satisfactorily in an electric bath, directly after buffing, it is good practice to dip the work for a moment into a water soluble solvent, then rinse it and then run the work through an electric cleaner or a still bath. In choosing a water soluble solvent it is necessary to pick one that rinses freely after coming from the alkaline cleanser. Incidentally, in smaller shops where the work is not put through an automatic it is frequently the custom to clean polished copper in a still bath instead of in an electric bath. In this case 2 or 3 per cent of soap may be carried in the cleaner with perfect safety, and if the work is left in the cleaner long enough it is usually not necessary to give a pre-dip in a water soluble solvent.

Now for a distinctly different phase of plating—DIECASTING. Here a freely rinsed, but slightly etched surface is generally desired for the best adherence of the plate. To attain this, an electric current is generally used. The type of compound should be a mixture of sodium silicate and trisodium phosphate with approximately 10 per cent of free caustic soda to provide an etch. The silicate in this instance acts as a buffeting agent. In the absence of electric current a similar formula should be used but approximately 2 per cent of anhydrous soap will greatly facilitate the cleaning. If an etched surface is not desired, a proper combination of phosphate and silicate should be used, the phosphate to do emulsifying and aid free rinsing, the silicate to do emulsifying and act as a buffing agent on the phosphate. No soap should be in the cleaner if current is utilized. Newer type silicates high in Na_2O content should not be used on diecast work unless they are buffed with adequate quantities of ordinary sodium silicate to prevent tarnishing and excessive etching.

It should be mentioned herein that the so-called soft metals used in the manufacture of novelties, jewelry, and similar work, should ordinarily be handled the same as diecasting. By soft metals we mean those referred to as antimonial lead, German silver, Brittania metal, lead, terneplate, white metal, and zinc. However, it should be remembered that in handling the above metals an etched surface is not desired. Therefore, the cleaners as suggested above should be those without any caustic at all.

In handling silver and brass before plating, the same procedure and

ROTO-CLONE DUST CONTROL SYSTEMS *mean..*

★

HIGHER COLLECTION EFFICIENCY

★

SAVING OF SPACE, PIPING and POWER

★

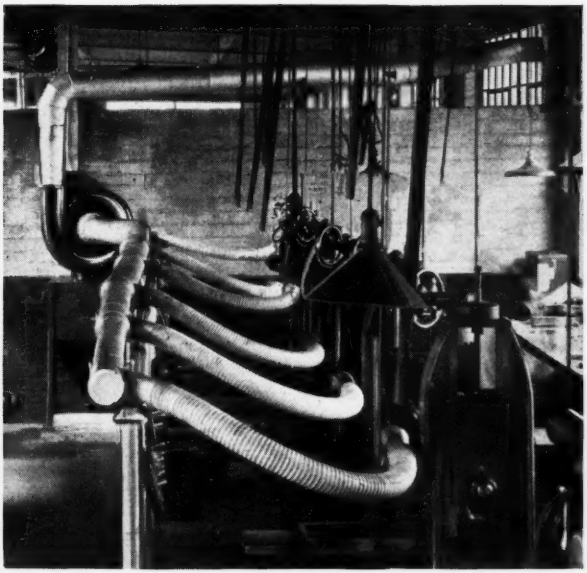
GREATER ECONOMY

★

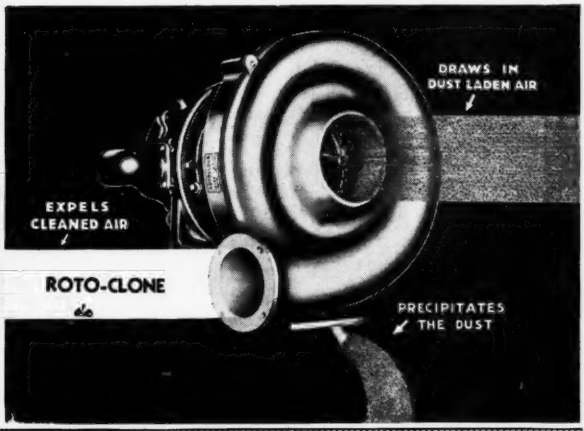
Write for Bulletin #207H TODAY!

★

AMERICAN AIR FILTER COMPANY, INC.
INCORPORATED
CENTRAL AVENUE
Louisville, Ky.
In Canada DARLING BROS., Ltd.
Montreal, P. Q.



Grinders Equipped With ROTO-CLONE Exhaust System



ROTO-CLONE

Combined Exhauster and Dust Separator

products can be used as were mentioned for the handling of buffed copper. The alkaline mixture should run between 15 and 25 per cent of caustic soda, should be buffed with some silicate, should have some phosphate to provide free rinsing, should not contain soap where the electric current is used (if absolutely necessary no more than 1 per cent of soap should be combined in the compound), and can contain as much as 2 per cent of soap if still cleaning is utilized. It is possible to use the newer silicates with a high Na_2O content in place of a mechanical mixture providing weak concentrations can be operated. In stronger concentrations it is necessary to buff the high Na_2O silicate with some plain sodium silicate.

To sum up on cleaning before plating steel, with the electric current, 35 to 50 per cent of free caustic, or a high Na_2O silicate with no soap is indicated. For removing buffing compositions, a pre-soak in a water soluble solvent or a soap bath is frequently advisable. This is to be followed by still tank cleaning or the electric current, using the electric current, 35 to 50 per cent of free caustic, or a high Na_2O silicate with no soap is indicated. For removing buffing compositions, a pre-soak in a water soluble solvent or a soap bath is frequently advisable. This is to be followed by still tank cleaning or the electric current, using an alkali containing no more than 15 to 25 per cent caustic. For soft metals and diecasting cleaners of the phosphate type buffing with silicate is recommended and 10 per cent of caustic is permissible if an etched surface is desired on diecastings.

Cleaning Before Lacquering

Cleaning brass, or brass plated steel or iron, before applying a coat of clear lacquer is a distinct problem. Here it is necessary to clean the brass and yet retain a very high lustre. For this type of work soap solutions held to a low pH and to a temperature of around 150 to 170 degrees F give the best results After the buffing compound and incidental dirt is removed in the soap solution, and the work has been rinsed, a clear lacquer can be applied. It should be noted that where brass plated cast iron is to be lacquered it is frequently necessary to soak the work not only in a soap, but in a special chemical to draw out all the cyanide from the pores so that spotting-out will not develop at a later date. Recently several inexpensive chemicals have been perfected that apparently keep cyanide spotting-out to a minimum.

Cleaning Before Synthetic and Proxylin Lacquering

This type of lacquering is usually done on steel, and it is necessary to get a chemically clean surface, free of either alkali, or acid, except where an oil primer is used. This type of work is handled either in a washing machine or in tanks. In case a washing machine is used a trisodium phosphate type of cleanser containing no more than 20 per cent of caustic, and containing no soap, usually gives the best result. Silicates tend to leave a white film on the work and are difficult to rinse. A high caustic content is unnecessary and is difficult to rinse. Soap causes excessive sudding. In some cases it is possible to use the high Na_2O complex silicates, but to get best results frequently trisodium must be added to the bath.

In case of still tank cleaning on these operations, the same type of cleanser should be used, but soap is permissible, however, no more than 3 per cent on an anhydrous basis.

Cleaning Before Japanning and Painting

In this case, it is ordinarily not necessary to obtain a chemically

clean surface. The chief problem seems to be to remove heavy coatings of oil, grease and incidental dirt, and to leave a surface that is compatible with an oil primer or paint, and at the same time to make certain that no rust develops in processing. To do a good job, much the same type of cleaner as used before synthetic lacquering is indicated. However, in the case of washing machines and long conveyor lines where the work is apt to be stored or have quite a travel before going to the paint tank, it is advisable to use a water soluble solvent in place of an alkali cleaner.

The water soluble solvent should remove both animal and vegetable oils, be non-alkaline and not have any chemicals in it that would interfere with the subsequent coating. The function of a water soluble solvent is to wet-out the metal, remove the heavy coating of dirt and grease, and leave in its place an imperceptible solvent coating, which will tend to prevent rust while the work is in the shop or in transit. As stated before, this solvent should be compatible with the japan or paint thinner, so that it will not interfere with the coating. Water soluble solvents have the great advantage of cleaning adequately without danger of subsequent rusting or of white streaks on the work, which may cause the paint or japan to blister. Generally this method is superior to alkaline cleansing.

Vitreous Enameling

This process generally requires a better cleaned and more carefully prepared surface than any other finish. Alkaline cleansing is the only method heretofore found perfectly satisfactory. In this process, all work is done in tanks, and to handle the average run of work the proper vitreous enamel cleaner should contain from 35 to 50 per cent of caustic soda, the balance being silicate with some phosphate if desired. Soap is also quite necessary for wetting-out and as an aid in emulsification. Most vitreous enamel cleaners contain from 8 to 12 per cent of anhydrous soap. In place of mechanical mixed cleaners, high Na_2O complex silicates, of an alkalinity corresponding to a cleaner made with around 45 per cent of caustic soda seem to give even better results than alkali mixtures.

The proper silicate to use is one containing about 60 per cent Na_2O. It is preferable in vitreous enameling to add the soap or emulsifier separately to the tank rather than have it mixed in with the silicate or compound, inasmuch as most drawing compounds used on work prior to the enamel process contain high percentages of fat and so the alkali forms soap in the cleaning tank. Excess soap is very dangerous in the enameling process as it is dragged through the rinse tank to the pickle tank where the acid splits the soap to form free oil which floats on the top of the pickle. This in turn is dragged through the rest of the cycle and causes bare spots, copper-heading, and similar trouble.

Summary

This article is of necessity somewhat complex, as the writer has attempted to take into consideration the varying conditions met in production. While the above break-down of operations, together with recommendations as to the proper cleanser to use, is not as complete as one would like, it should serve as a practical guide to enable the production man to decide what type of cleanser he generally wants to use to handle his individual problem, and just what things to avoid.

Generally, it should be remembered that where heavy duty cleaning on ferrous metals is desired, one should use a highly alkaline cleanser, or a high alkaline silicate, with a wetting

agent such as soap if the operation permits. Soap is to be avoided in washing machines and in electrocleaning. On handlng oxidizable metals a much lower caustic content is indicated, and where rinsing is a problem, a trisodium phosphate type of cleanser should be employed, as phosphate rinses very much more easily than silicate. Where the operation permits, such as in painting and japanning, it is advisable to use a water soluble solvent, which will clean and at the same time prevent rust, rather than an alkaline type of cleanser.

If production and control men would insist on knowing the general characteristics of any cleaning material offered for consideration, this article should serve as a guide to enable them to determine whether or not the particular product offered is suitable for the purpose recommended, and so considerable time and money should be saved.

"400 Practical Applications for Monel, Nickel and Inconel Under Corrosive Conditions" is the title of a 26-page catalog which is now being issued by The International Nickel Company, Inc., 67 Wall St., New York, N. Y. The selection and application of construction materials for severe service requires discrimination, care and a sound background of fundamental information and experience. Inco Technical Service is highly comprehensive along such lines and is available alike to builders of machinery and equipment and those who have to use and maintain it.

Inco files contain a very great quantity of information from laboratory studies, operating plant surveys and practical operating experiences on a great variety of industrial equipment problems. This information is always available to those who can be aided thereby in selecting materials.

The Inco Research Laboratory is thoroughly modern and very well equipped with tested machinery and apparatus for various types of metallurgical, corrosion and engineering studies. A great deal of information on corrosion, particularly on its fundamental factors, has been developed in the laboratory. Special problems arising in commercial fields are under study there at all times. Engineers who specialize on corrosion are available for field consultation and cooperative studies of special plant problems. Special methods of handling such problems have been developed and applied very usefully over a long period of years. The difficulties of duplicating exactly the conditions of liquid compositions, temperatures, velocities, and so on, which make purely laboratory tests of no value in most cases have been surmounted by the practice of providing corrosion test "spools" for suspension directly in operating equipment where the operating conditions are actually those of the test.

Assistance and advice of another group of Inco engineers can be had for fabricating Inco products. This branch of Inco service covers all types of operations from small stamping and drawing, through spinning and machining to the construction of heavy processing equipment of all varieties and shapes. Assistance in welding and jointing for either new construction or maintenance is another feature of Inco service.

Inco Technical Service has prepared this bulletin on various fields of applications of Monel, Nickel, Nickel-Clad Steel and Inconel. Copies of "400 Practical Applications for Monel, Nickel and Inconel Under Corrosive Conditions" free upon request.

"A Guide to Longer Life for Iron and Steel Products." This is the title of a very interesting 24 page booklet which is now being issued by the American Hot Dip Galvanizers Association, Inc., American Bank Bldg., Pittsburgh, Pa. Included in this booklet is a short description of the history of hot dip galvanizing and a description of the application of this metal finishing process. Copies of this booklet can be obtained by writing to American Hot Dip Galvanizers Association, Inc., American Bank Bldg., Pittsburgh, Pa.

Ford High Speed Hand Cut Rotary Files in a wide variety of shapes and sizes are described and illustrated in a six-page folder which can be had by addressing M. A. Ford Mfg. Co., 417 Pershing Ave., Davenport, Iowa. The different styles are listed by number, simplifying the task of ordering. Specifications and prices are included. Copy free upon request.

Don't Let Your FINISHING ROOM Be a Bottle-Neck

Finishing processes that take a long time to complete are going out-of-date. With modern industrial finishes, processes that formerly took days can often be done in hours... those that took hours, in minutes. This means more rapid production and fewer rejects due to dust spots.

Maas & Waldstein, specialists in finishes for products turned out in quantity, are leaders in the development of modern, "speed-up" finishes. The ideal of both the M&W research staff and M&W field representatives is to "fit the finish to the manufacturing process."

If your finishing room is a bottle-neck, let M&W study your problem and suggest a remedy. A letter will place an M&W finishing engineer at your service.

Maas and Waldstein Co. Newark N.J.

Branch Offices and Warehouses . . . 1336 Washington Blvd., Chicago . . . 1228 W. Pico Blvd., Los Angeles

LACQUERS **PIONEERS IN PROTECTION** ENAMELS

The Control of Size of Abrasive Powders

In this article, there is outlined the important factor of size control of sub-sieve sizes. A method of control used by the producers of electric furnace abrasives is described.

By Henry R. Power

The Carborundum Company, Niagara Falls, N. Y.

THE finer sizes of abrasives, those that pass the finest woven silk or wire sieves which have apertures of 44 microns, obviously cannot be controlled by the usual sieving tests which are applied to coarse grits. The finer sizes are now produced in large quantities and are, in turn, coarser than true colloidal particles which are 3 microns and smaller. In the zone between 44 microns and 3 microns several size classifications are offered by the electric furnace abrasive producer to the polisher for performing the numerous operations of fine finishing on the host of metals and alloys, which are lacquered, or otherwise coated. Both silicon carbide (Carborundum) and electrically fused alumina (Aloxite) are available in the various classifications.

The necessity for accurately sized or classified abrasives is apparent if one considers the hardness of these materials. Silicon Carbide with a hardness next to the diamond, and fused alumina close to the ruby and sapphire are obviously more abrasive in their action than the softer buffing materials like calcite, rouge, tripoli, diatomite, and rotten stone. In the case of the latter, large increments in the average particle size are permissible for the usual polishing job because of the ease with which they break down in use. In other words, the nature of the materials permits of heterodispersity.

A soft abrasive crushed to say 300 mesh and finer, without further separation is quite suitable as a component of buffing sticks, and abrasive pastes, or in loose form, for use by the polisher. By an actual abrasive test or scratching effect on a soft metal like silver, such a soft, heterodisperse powder will give the same effect as one more accurately sized. There is no commercial reason, therefore, for expending time and labor in close classification of soft abrasives.

With the extremely hard electric furnace abrasives on the other hand, very definite differences can be noted in the abrasion test made with classified abrasives in the zone under discussion. Laboratory tests have been confirmed by the polisher and other users of these classified powders, and with the more critical standards of finish demanded of the polisher by the consuming trade, together with the polishers own desire for economy in production, the necessity for even greater accuracy has been apparent to the producer of electric furnace

abrasives. He has been eminently successful in his endeavors to achieve this accuracy.

Other industries have been called upon to control the size of their fine product, for instance, the Portland Cement of today is no longer measured by a simple sieve test on No. 325 sieve, but is controlled by sedimentation in kerosene according to the method of Wagner described in the proceedings of the American Society for Testing Materials. The pigment industry once used the microscope for measuring the size of its powdered products below 44 microns, but it too has begun to appreciate the merits of a sedimentation control method. The sedimentation method consists of a tube one meter long containing a proper fluid like water, kerosene, or alcohol, which readily wets but does not react with the material under test. Attached to the sedimentation tube is a collecting tube, properly graduated.

A weighed amount of the powder is placed in the head of the sedimentation tube, and allowed to fall by gravity through the column of fluid, to the collecting tube below, where at intervals the volume settled is measured and tabulated. Using Stokes law for the velocity of fall of bodies under such conditions, which involves the viscosity and density of the settling medium, the radius of the particle and its specific gravity and the distance through which the particle falls, it is possible to obtain values which are plotted as time vs. micron size, to give curves which represent the size distribution of the sample under test. Comparing this curve with a standard powder gives a good control of the grading.

Commercial powders have been prepared to match standard curves within one-half micron. This method is quickly applicable to sizes down to 5 microns, below which the rate of settling is slow, though with proper selection of settling medium and defloculant, smaller sizes ought to be measurable. Details, such as preparation of the sample, tapping of collecting tube before taking readings, illumination, and so on, are all necessary to the success of the method.

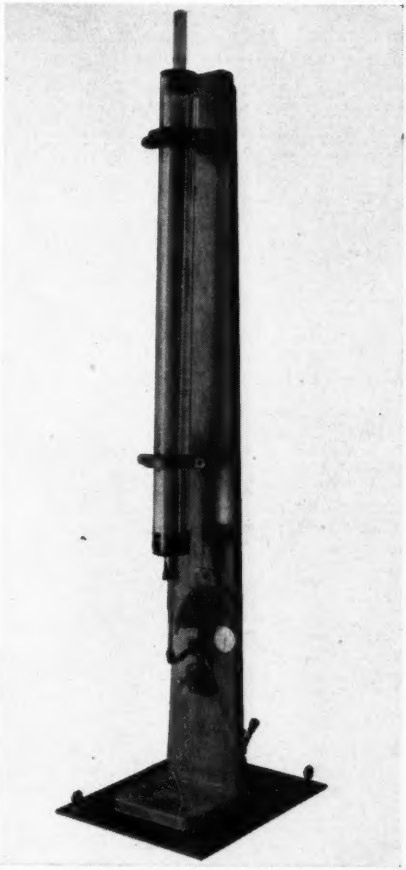


Fig. 1—Apparatus used for testing fine abrasive powders such as Carborundum and Aloxite. The sizes of these powders range from 44 microns to 5 microns.

Fig. 1 shows the necessary appa-

ratus for measuring or grading small particles.

For many years, now, this system has been applied to the successful grading and control of electric furnace abrasives, long before it was accepted as necessary equipment in other industries handling powdered products. The development and daily use of such thoroughly practical laboratory control methods for all phases of abrasives testing has been responsible for the uniformity and technical excellence of the shipments to the polishing shop from the plant of the electric furnace abrasive producer.

Manhattan Hose Bulletin. The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., has recently issued a 4-page illustrated folder entitled "Manhattan Hose Bulletin". This folder, in addition to showing many actual and unusual installations of Manhattan and Condor hose being used in a wide range of different industries, also contains a detailed description of the types of construction of Manhattan Hose and helpful technical data.

"Haveg Standard Rectangular Tanks and Accessories". This is the title of a bulletin which is now being issued by Havey Corporation, Newark, Delaware. Havey 41 rectangular tanks are described and illustrated in this publication. This type of tank is molded from a mixture of special acid washed asbestos and a synthetic phenol-formaldehyde resin. This composition has strength, toughness and durability, together with excellent corrosion resistance, which is not merely a surface condition but which extends throughout the entire mass of the material. Haveg is exceptionally resistant to almost all acids, salts, chlorine, weak bases, solvents and other chemicals.

Havey 41 rectangular tanks are not affected by rapid temperature changes and can be used continuously at temperatures as high as 265 deg. F. Because of its low thermal conductivity, it is normally unnecessary to insulate Haveg equipment. Rectangular Haveg 41 tanks are molded in one piece, without seams or joints, in practically any size up to 9 ft. 6 in. long x 6 ft. wide and 6 ft. deep. By the use of sections, which are bolted together, it is possible to produce tanks of practically unlimited length. Covers, outlets, drains, and pipe connections are readily supplied. Haveg 41 tanks are non-conductors of electricity and are not subject to electrolysis. They are particularly serviceable in electroplating operations.

Design data for Haveg 41 rectangular tanks is listed in this bulletin in table form. The design of long shallow sectional tanks, showing method of fastening the sections is also illustrated and described. A copy of "Haveg Standard Rectangular Tanks and Accessories" will be sent free upon request.

"The Acid Test of Better Piping". This is the title of an 18-page catalog which is now being issued by The United States Stoneware Company, 60 East 42nd St., New York, N. Y. "Flexlock" Rubber Joints are described in this catalog. Flexlock is said to be a true compression flexible coupling which requires no bolts or threads to retain the rubber in position. All the rubber in Flexlock Rubber Joints is permanently under compression and does not require an initial fluid injection or periodic re-injections to maintain the compressive state of the rubber. In Flexlock, the absence of internal fluids under pressure is said to eliminate the loss of sealing effectiveness due to leakage or absorption of the fluid compression medium. Flexlock is said to give four solid inches of sealing length.

In addition to Flexlock, U. S. Stoneware Pipe to be used in connection with Flexlock Rubber Joints is described. Tables of dimensions and specifications are given for bell-and-spigot pipe, bell-and-spigot pipe fittings, floor drains, acid-proof traps, sump tanks, rectangular vent pipes, ventilating caps, and damper pipes.

U. S. Standard Chemical Stoneware is made of De-Aired and Electrolyzed clays, insuring a very dense-bodied, close-grained, granite-like structure possessing maximum strength and toughness. The entire body is said to be acid-proof, alkali-proof and corrosion-proof all the way through.

Copy of "The Acid Test of Better Piping" will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

WHEN IT RAINED

Remember those black cotton umbrellas the ladies used to carry? They had long, thin handles and a sharp point at the tip that could be a formidable weapon in the hands of an angry woman.

The metal parts of these umbrellas were finished in Black. Hilo Black Baking Japan was a popular choice for this purpose, because it gave a glossy, jet black finish that did not fade, chip or crack even after constant exposure to the weather.

Umbrella styles have changed. The ladies now shelter themselves under gaily colored umbrellas that are short and stubby. But there's as much need as ever for finishes that hang on through hard wear and constant exposure. Hilo Black Baking Japans are best sellers today, as they were 50 years ago, because they fill that need.

Prove their dependability for yourself. Fill out and mail the coupon today for a generous free sample.

HILO VARNISH CORPORATION

42-60 Stewart Ave., Brooklyn, N. Y.

Boston, Chicago

HILO

HILO VARNISH CORPORATION

42-60 Stewart Ave., Brooklyn, N. Y.

GENTLEMEN: We'd like to try a free sample of Hilo Black Baking Japan.

Company .....

By .....

Address .....

City and State.....

Check Type Wanted

gloss	air dry
eggshell	baking
dull	250° F.
Rip-pl	350° F.
Crystal	

For use on:

Wood....., Steel....., Cast Iron....., Brass....., Aluminum.....

Barrel Finishing of Metal Products

Thirteenth Article of Series—Factors in the Use of Cream of Tartar as a Burnishing Medium

By H. Leroy Beaver

FOR several months we have promised various readers of this series of papers a resume of the use of cream of tartar in the various processes of metal finishing, and especially so as it related to the finishing of small brass parts.

What we at the time regarded as a comparatively simple task has on the contrary proven to be a somewhat difficult one, for while we have had a great many requests, some insistent, upon investigation we find that the use of cream of tartar is confined to a very restricted area. Around its use there has seemed to be an air of mystery for which, of course, there could be no reasonable excuse, and we believe that the reason why the processes in which its use is indicated, are so simple in application, that one inquiring into them could very easily and quite unconsciously have the feeling that there was an all-around wish to withhold as much information as possible on the subject.

This of course, is not true, because authorities who have always expressed the greatest willingness to be helpful in every way, have in this instance found far less to say on the subject than they themselves believed it would warrant.

But first let us examine the subject and determine just what is "cream of tartar".

TARTAR is the name commonly applied to crude acid potassium tartrate or "bitartrate of potash" H K ($C_4H_4O_6$). During the process of fermentation, wines deposit a crystalline crust of argol; this, after being roughly pulverized by recrystallization is known as tartar and when further purified and freed from coloring matter becomes "cream of tartar".

As to the exact method of its preparation we are told that "cream of tartar" is prepared by dissolving granulated argol in boiling water and allowing the solution to stand. The clear liquid is then drawn off and crystallized. The slightly colored crystals thus obtained are redissolved in hot water and the coloring matter is gotten rid of by means of pipe clay or egg albumen and the solution filtered and crystallized. The name generally given to the crust of minute crystals that form on the surface is cream of tartar.

The slight solubility of cream of tartar in alcohol perhaps explains why it is deposited by wines as they mature. One part by weight dissolves in 15 parts of boiling water but at lower temperatures the solubility is greatly diminished and at 0 deg. centigrade about 416 parts of water are required to dissolve one part of cream of tartar.

Should borax be added to cream of

tartar, it immediately deliquesces and by this we mean that such a mixture becomes a liquid by reason of absorbing moisture from the air.

As in so many cases gone before, we are indebted to and most gratefully acknowledge the valuable aid and suggestions given to us by Mr. George B. Hogaboom. For this paper, he first supplies us with a translation from the French of his original Roselieur which seems to indicate that cream of tartar was undoubtedly first used in France in the year 1852. While we are primarily interested in its application to barrel finishing processes, we must take into consideration this and other earlier uses in order to form some conjecture as to just how it came to be adopted as the acidulating agent for a barrel finishing solution.

In this first use by Roselieur, the solution of cream of tartar was used in an immersion solution for brass parts prior to tinning. This tinning process is even today largely applied and is generally referred to as an immersion or contact plating where the parts are boiled in a tin solution. This is a method generally used in the manufacture of tin coated brass pins.

Following this, we have another reference from another widely known authority on earlier methods and practices, for our good friend Mr. George Gehling tells us that back in the year 1882 one Charles Aiken brought this same process to the United States from England, and that Mr. Gehling himself first used it at a plant located at Union City on the Naugutuck in Connecticut. He also says that he is of the opinion that a solution of cream of tartar was used in Waterbury even prior to that date, so we believe we may feel safe to state that the first use of cream of tartar in the United States was in New England and particularly throughout the Naugutuck Valley, where perhaps more brass finishing is done than in any other section of the country. We might assume that in these first instances the cream of tartar solution was used in the sense of a flux on the brass parts to assure better adherence of the later deposited tin coating.

We come now to another and quite different application of a cream of tartar solution. In many plants various operations are required to fit brass parts and brass plated steel parts for a final finishing operation.

For instance, in producing a brush brass finish with pumice and water, as each part is brush finished it is dropped into a storage pan containing a solution of cream of tartar and water to prevent oxidation and rust until a sufficient quantity of parts have accumulated so that a production lot may be then washed, dried and passed on to the next step in the finishing process. This operation has seemingly become quite standardized in that a generally used regulation storage pan made of sheet copper is adopted for holding the solution. These pans measure 24 in. long, 18 in. wide and 8 in. deep. The cream of tartar solution used in them is not what we might term a saturated one, but a small quantity of cream of tartar is added to the water in the pan to acidulate it, generally about two ounces of cream of tartar to each gallon of water.

Many metal finishers apparently, and the writer as well, at one time had the impression that the so-called "cream of tartar roll" was the final finish given to brass products, but as we investigate more fully into the subject we find that in a large majority of its applications it resolves itself simply into **one step** in a process involving other operations up to the securing of the final finish.

In the course of this investigation we have met with so many formulas covering the use of cream of tartar

and especially as used in a burnishing barrel that we hesitate to select any one of them which might be suggested to be a normal solution for they vary so greatly. Perhaps we had best select a concrete case where we were present during the operation, and where the operator himself was one nationally known in the metal finishing industry. It has been several years ago that the writer stood beside Mr. George Gehling during the barrel finishing with cream of tartar solution of a batch of brass safety pins which were being brought to a bright and lustrous finish prior to being tin plated.

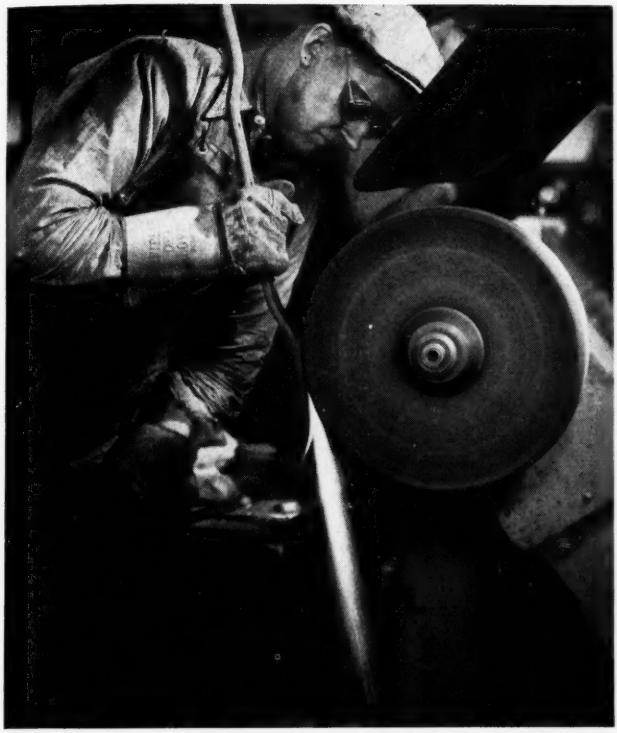
In this operation, the quantity of pins would perhaps approximate a peck and a half in bulk, and these were operated in about four gallons of water in an oblique tilting type wood barrel. We do not recall the quantity of cream of tartar used or the operating time, but within the past few days we have again discussed the subject with Mr. Gehling and he tells us that to such a quantity of water and load of work they used just as much cream of tartar as could be conveniently picked up with the fingers of one hand, perhaps approximately two ounces to the load. This charge was operated until the solution acquired a bright green color and at this time the solution is no longer effective, and the work is generally completed. This averages a run of about twenty minutes.

Cream of tartar burnishing is not what we might rightfully regard as a present day or modern operation for while there was a time when it was very widely used, this use has dwindled and is perhaps due to the advent of ball burnishing with a soapy water lubricant. From our investigation during which we have made wide inquiries in search of the most authoritative information, we are grateful for the data received from Messrs. Hogaboom, Gehling and Gray. These three men we consider to be the best informed in this country on the subject, and they have been very generous in every way in contributing to the information as herein contained.

Now it must be remembered that, while barrel finishing, burnishing, rolling, or tubbing, as the operation is variously called, are pretty generally known at this time, this was not true of the period twenty-five years ago. For example, the very well known and nationally used Abbott Burnishing Barrel was only originated by Mr. George E. Abbott twenty-eight years ago, and that more progress has been made in the past fifteen years than at any time before in the history of the practice of the process. We believe we would be entirely correct in stating that finishing with a high lustre with steel balls and a soap solution has largely supplanted the former cream of tartar finishing, except in such cases where the cream of tartar finishing was followed by a later operation of tinning. This is perhaps, in more ways than one, unfortunate.

In the cream of tartar process the acidulated solution, accompanied by a small quantity of soap bark chips, produced clean and beautiful finishes at one operation, but in ball burnishing to replace the cream of tartar operation the necessity arises for the use of an acid bright dip, followed by the barrel burnishing operation, and it was interest in cream of tartar solution as an acid brightener as contrasted with the customary sulfuric, nitric, muriatic or 3-2-1 acid bright dip that we have further speculated on the subject of producing a bright finish on brass parts or brass plated parts particularly.

We had reasoned that if a solution consisting of two ounces of cream of tartar to one gallon of water when operated on brass parts in a revolv-



Modern Polishing for Modernistic Furniture with

ALUNDUM ABRASIVE

FOR jobs such as this polishing of tubing for modernistic furniture, they like the "plus" features of Alundum Abrasive that mean lowest cost polishing.

Special tests at the electric furnace plant assure its hardness and toughness; special crushing and screening processes assure its accurate shaping and sizing; special surface treatments give it extra capillarity—extra "sticking" power on the wheel head.

NORTON COMPANY
Worcester, Mass.

G-67

NORTON ABRASIVES

ing barrel for a period of twenty minutes produced a bright and highly lustrous finish that in this might lie the solution for either the modification of or perhaps, more hopefully, the elimination of what a plater once described to me as "That double distilled extract of Hades called by courtesy an acid bright dip which when brass parts are immersed in it for only an instant throws off a black fog of perdition that sends the operator away from the crock gasping for breath." From some bright dipping operations we have seen we might better term the operation a partial annihilation of metal products. Surely, there must be some other and far more acceptable method for brightening brass than this, and if a cream of tartar roll gives the desired result, then it deserves to have the widest publicity.

For over twenty-five years we have been conducting research work and answering questions from metal finishers generally covering all angles of barrel finishing, and we hope we may now be permitted to just once reverse this order and ask a question and it is this:

> "Would you consider a solution made by adding two ounces of cream of tartar to a gallon of water, and which would produce a bright and lustrous finish on brass parts in twenty minutes of operation in a barrel, a modified or restrained bright dip?"

Now suppose we were to make up such a solution of two ounces of cream of tartar to a gallon of water and take the pH of this solution which we would find to be pH 4.5 (we don't know what the actual pH would be and this figure is merely arbitrary). Now suppose we take another gallon of water and from a conventional acid bright dip composed of 3 parts of sulfuric, 2 parts of nitric and 1 part muriatic acid. We slowly add this acid mixture to the water until the second gallon also shows a pH of 4.5. The pH of the two solutions now being the same, if we placed them in separate barrels and operate them on the same kind of brass parts, would or would not the results be substantially the same? No, we do not know the answer and have not made the test and that is why we are asking the question. Our research work does not involve chemistry. We do know that we have had many complaints from platers concerning acid dips, and especially where no exhaust systems were provided, and we therefore pass this problem along to those chemical authorities within the industry for solution.

We have another problem in connection with the use of cream of tartar in the barrel finishing operation and for which we are unable to find an explanation. It will be noted that in the process of cream of tartar burnishing or rolling, where we use two ounces of cream of tartar in solution we also add one ounce of soap tree bark. One of the authorities who has used this method for a great many years has this to say, and we quote from his letter as follows:

> "Our final finish roll is a cream of tartar and soap bark roll. Several times when we have run out of soap bark we have tried to roll with cream of tartar only and in each case the final finish was inferior. Again we have tried using regular soap chips with cream of tartar with the same poor results. **Why this should be so, we do not know."**

In the December issue of Products Finishing covering the use of Soap in the barrel burnishing process we gave a brief description of Chilian Soap Tree Bark which is the product referred to in connection with cream of tartar finishing. This product contains a glucoside saponin having the formula Cn H 2n — 8 O 10. Now to just what extent this product reacts with cream of tartar whose symbol is

H K ($C_4H_4O_6$) and what is the resultant product, and how does it differ in its reaction against brass, we do not know, but there must be a well defined reason why a cream of tartar solution operates efficiently when combined with soap tree bark and inefficiently when operated alone.

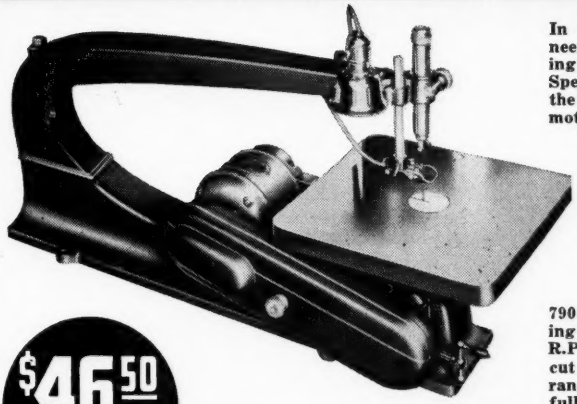
It will be noted that our research has been directed toward the mechanical features of the practice and the instrumentalities and methods rather than the chemistry involved in the process. So we must rely on some of our good chemist friends to analyse the two above formulas and advise us why two ounces per gallon of H K ($C_4H_4O_6$) is inefficient until we add to it one ounce of CnH_2n—8O10. When we receive this information it will be fully noted in Products Finishing.

That cream of tartar has an application in connection with metal finishing is borne out by a reference found in an old formulary bearing a publishers date of 1868 wherein it is suggested that a mixture of equal parts of cream of tartar, powdered alum and powdered chalk in paste form is an excellent polish for silver and brass.

When a considerable quantity of cream of tartar is required in production work it becomes an item of considerable expense and back in 1917-18 Mr. Harry Rathmun and Mr. William J. Gray of Waterbury, Conn., conducted a series of experiments in an effort to secure a product that would produce an equivalent result but at lesser cost. In this work they used tartaric acid, crude argol and pyrophosphate as all of these seemed to have the necessary acidic action. Of these three the pyrophosphate functioned best and later it was quite generally adopted as a substitute for cream of tartar, not only in the process of tinning but in rolling as well.

It is interesting to conjecture just

NEW SCROLL SAW of 1000 speeds



$46.50 WITHOUT MOTOR OR BELT GUARD

DELTA MFG. CO.

666 E. Vienna Ave. Milwaukee, Wis.

In 1932 Delta scored on engineering triumph by introducing the first practical High Speed Scroll Saw—permitting the running of the saw at full motor speed without troublesome vibration. Now—Delta is happy to announce a SECOND great step forward in Scroll Saw design—the perfected MULTI-SPEED DRIVE. Through this remarkable development you can select ANY SPEED YOU want from 790 to 1700 R.P.M. regulating the speed within 1 or 2 R.P.M. if you wish. You can cut any material within the range of the scroll saw with full assurance that you have the best speed for your purpose. Furthermore, scientific design has made this improvement simple, fool-proof and trouble-free.

what might have prompted the first use of cream of tartar in solution along with brass parts and operated in a revolving barrel. We know that the solution was used as a storage for parts in process and it would be a perfectly natural thing for some inquiring mind to attempt the use of such a solution in a barrel. Soap water burnishing was also practiced and soap bark in a water solution was used. Inasmuch as a cream of tartar solution in itself produces no lather or suds, and soap bark does, it would be quite natural to add soap bark to the solution, and the result being satisfactory resulted in the cream of tartar-soap bark operating solution as it is used today.

There is another application of cream of tartar used to some extent which, however, is an improper one. We understand, of course, that a cream of tartar solution in a pan is used for immersion storage of work in process both in brass or steel brass plated to prevent oxidation or rust. Someone, at some time apparently felt that such a solution would also be satisfactory for protecting steel burnishing material or steel burnishing shapes from rusting when not in active use. Such is not the case because cream of tartar even in a mild solution will definitely pit the surface of steel burnishing material and in confirmation of this we quote from a letter by Mr. J. H. Donohue, in charge of experimental work for The Abbott Ball Company Hartford, Conn., as follows:

> "There is no question but that the acid solution of cream of tartar will cause pitting of steel burnishing material, as the material we very recently left standing in a cream of tartar solution in a test, shows definite signs of being attacked."

So to any operator using this practice we would caution against it because it is certain that the pitting will continue until it will be found impossible to secure bright finishes from burnishing material stored in this manner when not in active use.

We have also had many inquiries from time to time as to the practicability of using steel burnishing material on brass parts while they are being operated in a cream of tartar solution. As we have stated in the previous paragraph that cream of tartar solution will pit and eventually ruin steel burnishing material, we would caution against such practice and definitely say "No," and we quote on this finally from another of our authorities as follows:

> "We have never advocated the use of cream of tartar in steel ball burnishing, nor would we use it to cover steel balls when not in use."

So in closing, to those who desire to experiment with cream of tartar finishing, the following procedure is recommended:

Use an open mouth oblique tilting type barrel either of maple made to hold wet solutions or of brass. First clean the brass parts you desire to burnish, in the customary way. Place them in the barrel with just enough warm water to cover. Add to each load of work where the liquid content runs to four gallons or less, two ounces of commercial cream of tartar and one ounce of soap bark chips. Operate the barrel until the solution turns to a green color. If the desired finish has not been obtained, drain off this green solution. It is then advised to add another charge of water, cream of tartar and soap bark and proceed until the desired finish is obtained.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

Free!
Introductory Offer

GIVEN AWAY FREE

2—50 c.c. Funnel-Top Burettes
1—10 c.c. Automatic Pipette
1—Burette Stand
2—Burette Clamps
1—100 ml. Graduate
1—250 c.c. Beaker
1—Erlenmeyer Flask
1—Sampling Tube
1—Brass Tube for Burette Stand
1—Tube of Stopcock Grease
1—Log Book, containing complete directions for making and recording tests.

Value - - - - $12.55

Analyze your plating baths accurately, quickly and easily with the improved and tested control system developed by the Platers Research Co.

As an introduction, all apparatus listed at the right will be given away *free* with the purchase of the necessary chemicals for operating any one of the following control sets:

ACID COPPER CONTROL SET

5 bottles of reagents for analyzing copper sulphate and suphuric acid plus free apparatus. Cost $13.50—Value $26.05.

CYANIDE COPPER CONTROL SET

7 bottles of reagents for analyzing copper cyanide, free sodium and sodium carbonate plus free apparatus with 1 - 50 cc burette, 1 burette clamp, 2 - 250 cc beakers, 2 Erlenmeyer flasks and 1 - 5cc automatic pipette added. Cost $18.50—Value $37.50.

NICKEL CONTROL SET

6 bottles of reagents for analyzing nickel content, chlorine content and pH in terms of alkalinity plus free apparatus with 1 - 50cc burette, 1 burette clamp, 2 - 250cc beakers and 2 Erlenmeyer flasks added. Cost $16.00—Value $32.00.

BRASS CONTROL SET

10 bottles of reagents for analyzing copper cyanide, zinc cyanide, free sodium and sodium carbonate plus free apparatus with 1 - 50cc burette, 1 burette clamp, 1 burette stand, 2 - 250cc beakers, 2 Erlenmeyer flasks, 3 glass funnels, 3 funnel rings and 100 filter papers added. Cost $26.00—Value $51.80.

No knowledge of chemistry is necessary to operate these sets. All calculations and quantities of chemicals necessary to correct the solutions are worked out and included with the control sets.

Because this offer is made at practically cost price we can allow no credit on purchase. Please remit with your order or permit us to ship C. O. D. F. O. B. Brooklyn, N. Y.

Available only until February 28, 1938.

PLATERS RESEARCH CONTROL + - SYSTEMS

PLATERS RESEARCH COMPANY

74 GRAND AVE. BROOKLYN, N. Y.

Practical Applications of Modern Equipment

Rubber-Lined Tank Proves Highly Successful for Bright Nickel Plating.

The 70-ft. steel tank, illustrated herewith, was lined with Triflex rubber by the Vulcalock process of The B. F. Goodrich Company, Akron, Ohio, and installed three and one-half years ago in the plant of a prominent Detroit automobile manufacturer. During this period, the tank has been used in connection with the Harshaw process of bright nickel plating at operating temperatures of 140 deg. to 150 deg. F.

The operation has been uniformly successful with no interruptions for

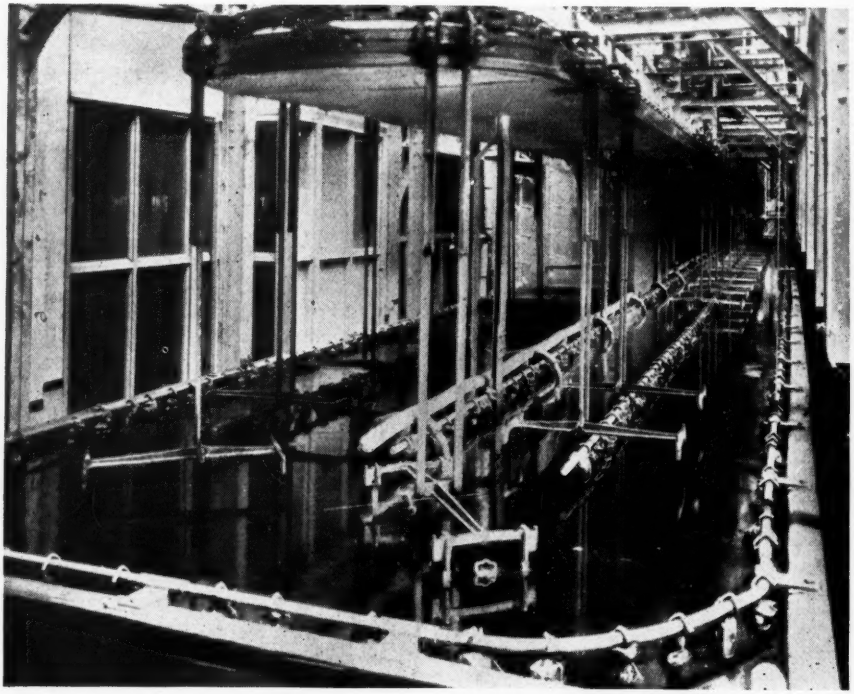


Fig. 1—A 70 ft. steel tank lined with Triflex rubber.

tank repairs. No trace of "treeing" or "plating out" has been encountered on the surface of the rubber lining. The solution is filtered continuously to prevent accumulation of sludge.

This installation is of particular interest to platers because of its size and the fact that it typifies good bright nickel plating practice.

Bristol Electrical Instrument Bulletin No. 496. The various improvements recently made in Bristol Recording Voltmeters and Ammeters are outlined in a bulletin designed as "No. 496" which is now being issued by The Bristol Company, Waterbury, Conn. Sample chart records and photographs of new instrument models, showing the compact and simple operating mechanism, are included in this bulletin.

Interesting facts are also given regarding the usefulness and the various applications of these instruments in such industries as public utilities, chemical, and so on.

A copy of Bulletin No. 496 free upon request.

Williams Catalog. J. H. Williams & Co., 75 Spring St., New York City, has just issued a new catalog describing their entire line of drop-forged wrenches and other standard stock specialties. Included in this catalog are many additions to their carbon and alloy wrenches, detachable "Supersocket" wrenches and "Agrippa" tool holders. Also listed in this catalog are the following lines—adjustable wrenches, both carbon and alloy steel; "Non-Sparking" safety wrenches, beryllium-copper; "Superector" reversible ratchet wrenches with detachable sockets. Copy free upon request.

Brown Numeral Print Record Folder. The Brown Instrument Company, Wayne & Roberts Avenues, Philadelphia, Pa., has just published a new folder entitled "Legibility plus Precisions." This folder, printed in seven colors, reproduces the colored numeral records exactly as they are printed on the chart of the Brown Potentiometer Pyrometer Recorders. The significance of the Brown (+) Symbol, an exclusive feature which is a part of each numeral record, is explained. Copies free upon request.

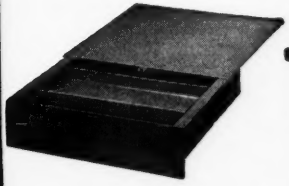
Work Benches for Your Shop

Use Steel for Permanence

No. 9-26—Similar to the number 5-26 except extension for back board. For single or continuous benches.

These Bench Legs and Drawers reach you all ready for you to quickly assemble your own benches by bolting on wood top, shelf and brace.

No. 5-26 BENCH LEGS—This leg is sturdily constructed and will make a rigid foundation for any bench requirement.



No. 1218-PCT BENCH DRAWER — Built of sheet steel — With inner sliding tray — Several sizes to suit your needs.

No. 48-30 COMPLETE STEEL BENCH—Furnished in various widths, depths and heights. Shipped knock down for assembling single or continuous benches.

ANGLE STEEL STOOL COMPANY
704 OAK STREET, PLAINWELL, MICH.

WRITE FOR CATALOG With PRICES and DETAILS

the FINISHING FORUM

Do you have a finishing problem?

Through the cooperation of outstanding authorities in the fields of metal cleaning, plating, burnishing, lacquering, and so on, Products Finishing is prepared to aid you in the solution of your finishing problem. There is no charge for this service.

Also . . .

If there is a "kink" or short cut in use in your shop, send in a description of it. . . . Each one published will be paid for.

Random Notes For the Small Plating and Finishing Room

By Charles H. Willey

THERE must be among the readers of PRODUCTS FINISHING a great many small factory finishing and plating room foremen who have experienced trouble and care due to the lack of planning and modern equipment. Our factory produces annually many hundreds of thousands, yes, safer to say, a couple of million small electric meters for the dashboards of automobiles, service station test stands, airplanes, laboratory work, and so on. In the buffing and polishing room there are but four men and all the buffing, polishing, grinding, and coloring of metal stampings is performed by them.

It is all done on two double spindle polishing lathes, of belt driven type, that are more than fifteen years old. Now the writer does not intend this article to be one that approves of old obsolete equipment, but rather it is a few random notes on what must be some of the other fellow's troubles, suffering the lack of better methods and equipment.

In the first place, our ability to keep going is due almost solely to the fact that we have a very efficient plating room foreman who spent many of his early years in the Navy as a buffer, plater, and finisher. He has trained his men to do good work, that is, work that will not come back. He knows and they know all the tricks of the trade that they can pick up from experience, reading and visiting. The second important item is the type of material that is used for the work of preparing the metal stampings for plating and enameling. Our plater has his own way on buying his cutting compounds, degreasing, and plating supplies. He is an avaricious reader of advertisements, and a good listener to salesmen for they are his only contact with the trade at large.

When he tells the purchasing agent he wants to try a new abrasive, or some new wrinkle such as an anode filter bag, which he has seen in an advertisement, or that he wants information from some one on a finishing problem, the P.A. sees that he gets what he wants. In the third place, our factory stamping room foreman and the plating and finishing foreman hold frequent councils of war

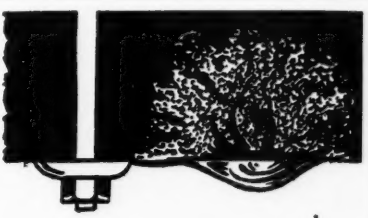
over the stamping quality. Some of the trouble and ideas that they have worked out reach clear back to the toolmakers, and the design and operation of their punches and dies. Sometimes, in attempting to save one operation at the press in making a part, a great deal of extra work can be placed unwittingly on the buffer. This procedure is more costly per piece than an extra operation at the press.

An example of this is that of making a meter front, or top, in a progressive type of die that blanks out a small opening in an oblong or oval shaped top that can not be spun while buffing but has to be manipulated by hand on the wheel face.

Great care has to be taken not to drag out the opening on thin stampings. In such a case, it is better to leave the slot opening out until the buffing is done and return the stamping to the presses for cutting out. The pieces can then be taken to the plating room and plated, and very little work is required to color them and no effect of the wheel is felt on the slot in the piece.

Also, on the tool end there is the ever present need of keeping the dies ground sharp to prevent chippings or slivers and burrs or rough edges. This requires watching on the part of the stamping foreman to inspect the tools before setting up and the work while running the dies. The individual pressman should be trained to watch his work for scores, scratches and dents, since parts can not be ejected with too much force into a chute or container or handled roughly if satisfactory finishes are desired.

Dies for drawn shells or cases and all forming tools should be kept smoothly polished on the forming surfaces and drawing edges and should be stoned and honed bright and smooth. The draw plates and the

STOP THOSE LEAKS
WITH MOLDED PLASTIC
HAVEG pickling TANKS


Unaffected by acids commonly used in pickling and plating —unaffected by rapid temperature changes or operating temperatures up to 265° F. Standard size tanks, piping, fittings, valves. Write for Bulletin PFO-1.

HAVEG CORP., Newark, Del.
CLEVELAND CHICAGO CINCINNATI DETROIT
LOS ANGELES NEW ORLEANS OMAHA TULSA

draw or forming edges and surfaces are the important parts to watch for they will load up with metal adhesion from the stamping strip if the stock is allowed to run dry in the process. Keeping the stock correctly oiled is another good help to easy finishing. Strip or coil stock must be carefully handled to keep it free of grit, dirt, scratches, dents, and anything that will carry trouble into the dies and give extra work and costs to the buffer or finisher.

Water and oil stains will sometimes show through some of the lacquer finishes or cause extra dipping in an acid bath, which again is costly and not necessary. The whole general rule insofar as the stamping manufacturer is concerned is close supervision constantly on the part of the designer, the toolmaker, and the stamping room foreman and his operators to well laid down rules of cleanliness and carefulness. Washing of the stampings is often desirable and necessary between operations at the presses and especially is this true of flattening or embossing dies.

Some parts lend themselves nicely to being stamped out of pre-polished strip and thus bring considerable savings to the finishing end, but this class of work is necessarily confined to stampings that do not stretch or draw the metal. There are, of course, some coated sheets or strips of zinc and other finishes to which stretching will not be detrimental.

Introducing Clean Air To Finishing Room

By John E. Hyler

THE importance of introducing clean air into the finishing room is easily under-estimated, with the result that the presence of dust may cause trouble. Dust may be drawn into a great many finishing rooms as a result of a condition of slight vacuum. This vacuum is caused by the exhausting fans used in connection with spray booths, which are used for the purpose of carrying away the spray-laden air.

When one stops to really consider the matter, the obvious remedy is to introduce air into the room at a somewhat greater rate than the exhausting fans carry it out. Then, instead of a condition of vacuum, there will be a slight compression in the room that will tend to repel dirt, rather than draw it from every available crevice.

Naturally, it is imperative to see that the air introduced is clean in itself, and to this end it is wise to draw it through filters by fan action. Different types of industrial filters that can be used for this purpose are on the market and are available. It is also considered good practice to have incoming air warm enough that it will facilitate the drying of finishing coats. A good idea is to arrange a duct through which the air may be drawn from a relatively clean source, equip the duct with a filter at one end, and fit it with some sort of heating arrangement on the inside. Steam coils will do for this purpose, or electric strip heaters may be used if preferred.

Another idea which has been used, according to a reliable source in the matter of avoiding a condition of vacuum, is the introduction of air directly into spray booths through the floor, creating an upward draft which moves the spray-laden air naturally toward the suction fan and on out of the booth. Naturally, supplying air directly to the booth in this manner reduces the pull of air from the finishing room proper, so that a condition of vacuum will not be so easily brought about.

Sarco Steam Hook-up Book. The main sections of this booklet, now be-

ing issued by the Sarco Company, Inc., 183 Madison Ave., New York, N. Y., are devoted to methods for calculating trap sizes, hook-ups and descriptions of various types of heating systems (including unit heaters and air conditioners), hook-ups for process steam applications, hook-ups for steam headers, hook-ups for temperature control, and basic descriptions of the fundamental characteristics of the various types of steam traps, temperature regulators and steam accessories. The booklet is well illustrated with blue print drawings and photographs. Copy free upon request.

Safe Handling of Acids and Chemicals. A new folder entitled "Safe Handling of Acids and Chemicals" has just been published by the Pulmosan Safety Equipment Corporation, 176 Johnson St., Brooklyn, New York.

This folder illustrates and describes many items of safety equipment designed to prevent accidents and eliminate health hazards associated with the handling of acids and chemicals. Among the items shown are Carboy Truck, Carboy Tilter, Carboy Drainer, aprons, gloves, goggles, respirators, hoods, skin protectives and acid-proof pails and dippers. Copies of the folder may be obtained upon request to the manufacturer.

Tubular Heat Exchanger Standards. The Heat Exchange Institute, 90 West St., New York, N. Y., through its secretary, Mr. C. H. Rohrbach, announces the publication of Standards of the Tubular Exchange Section covering mechanical, construction and thermal standards for shell and bare tube heat exchangers. The Standards contain data on exchanger, shells, tube sheets, baffles, support plates, tubes, material specifications, fouling factors and thermal design data. Copies of Tubular Heat Exchanger Standards are available at 75 cents each.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

Dedicated to Serve

the Industrial Finishing Field!

The Glidden Company is equipped with laboratory facilities, technical personnel, raw material sources, and processing equipment unexcelled in the industry.

These vast facilities are dedicated to the constant development and improvement of industrial finishes for all purposes. They have resulted in the perfection of many of the most outstanding successes in the industrial finishing field.

There's a Glidden finish for every industrial finishing need. Ask a Glidden representative to help speed your finishing operations and cut costs, through more efficient service.

GLIDDEN

Everywhere on Everything

GLIDDEN PRODUCTS NOW CARRY THE FAMOUS "TIME-TESTED" MARK OF QUALITY

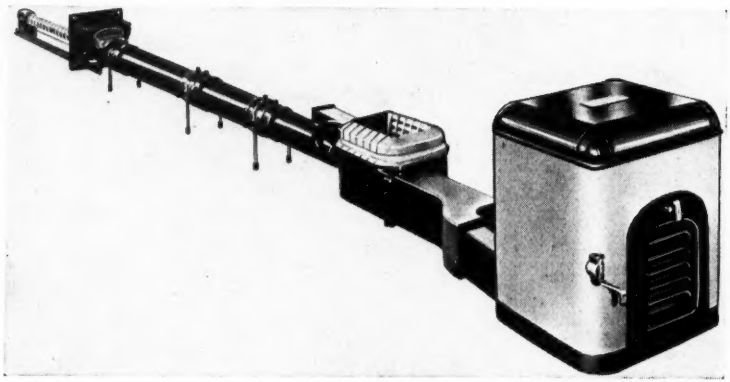
THE GLIDDEN COMPANY

National Headquarters, Cleveland, Ohio

Factories in:

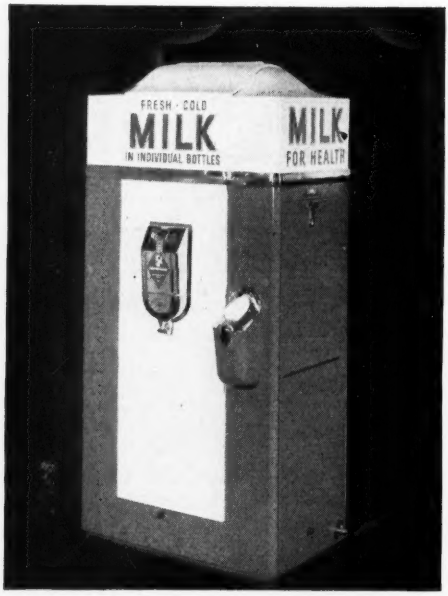
Reading, Pa. • Chicago, Ill. • St. Louis Minneapolis • New Orleans • San Francisco • Los Angeles • Toronto, Canada

FINISHES THAT AID IN APPEARANCE AND UTILITY



(Photo Courtesy Holcomb & Hoke Mfg. Co.)

(Photo Courtesy Mills Novelty Company)



(Above)—This attractive bin-fed stoker is spray finished in red and black synthetic enamel.

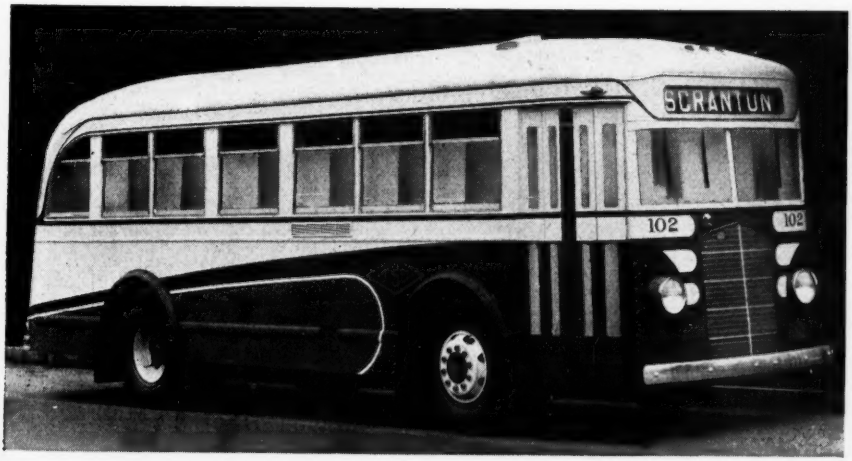
(Left)—The bottle milk vender shown herewith is finished in white and red. One coating of a primer is baked on this vender for one hour at 340 deg. F. There is an intermediate coating of a white finish which is baked for one hour at 325 deg. F. A final coating is then baked on for one and one-half hours at 275 deg. F.

(Right)—The pedestal and suspension type heaters shown here are beautifully finished with a brown crackle lacquer body and a heavy ornamental head of lustrous chrome. The air directing louver is ebony black.

(Photo Courtesy Hexcel Radiator Company)

(Below)—The exterior of this thirty-passenger urban coach embodies a high degree of rider comfort and eye appeal. The eye appeal is derived largely from the standpoint of design and finish. The exterior is finished in three beautiful colors and the interior in two colors. Note the modern streamline effect that is achieved through the correct selection and application of striping and contrasting colors.

(Photo Courtesy J. C. Brill Company)



NEWS OF THE INDUSTRY

General Abrasive Company Appoints Lea Manufacturing Company as Distributors

General Abrasive Company, Inc., 3505 Hyde Park Blvd., Niagara Falls, N. Y., has recently announced the appointment of The Lea Manufacturing Company, Waterbury, Conn., as exclusive distributors for Lionite Polishing Grains in Connecticut and Massachusetts. Complete stocks of all sizes will be carried in their warehouse at Waterbury, Conn.

Mr. Sam T. Keller Appointed District Manager of Yale & Towne

Mr. Sam T. Keller has been appointed district sales manager of the Yale & Towne Manufacturing Company, Philadelphia Division, in charge of this company's activities in the Detroit, Toledo, and Grand Rapids areas.

Mr. Sam. T. Keller

Mr. Keller will maintain headquarters at 7310 Woodward Ave., Detroit, Mich., and will direct activities in the sales and service of Yale Electric Trucks, Hand Lift Trucks, and Skid Platforms. Mr. Keller has been prominently identified with the automotive sales field for many years. Following a number of years with the General Motors Corp., he has in recent years been a member of the sales staff of the Chrysler Corporation.

1938 A.E.S. Convention Plans Being Made

The Milwaukee Branch of the American Electro-Platers' Society are happy to announce that the plans for the 1938 Convention to be held in Milwaukee, Wisconsin, are steadily progressing. The Educational Committee has announced that several of the country's foremost plating authorities have been engaged and it is believed that with all the active interest that has been shown so far, the 1938 Convention will be a complete success.

The Convention headquarters for the 1938 Convention will be at Hotel Schroeder, Milwaukee, Wisconsin. The date of the Convention is June 13, 14, 15 and 16. The Convention Committee has drawn up as follows:

General Chairman—R. M. Goodsell, 723 Lathrop Ave., Racine Wis.

Treasurer—Robert Steurnagel, 1508 W. Concordia Ave., Milwaukee, Wis.

Secretary—A. J. Hermansen, 3266 No. 2nd St., Milwaukee, Wis.

Committee Chairmen

Publicity—Robert Goodsell, 2901 21st St., Racine, Wis.

General Program—Phil. J. Ritzenthaler, 5408 W. Cherry St., Milwaukee, Wis.

Entertainment and Recreation—Jack Geissman, 2923 No. 45th St., Milwaukee, Wis.

Hotel and Reservations—Claude A. Terrill, 4123 N. 25th St., Milwaukee, Wis.

Shop Visitation—John Miszewski, Jr., 2544-A N. Bremen St., Milwaukee, Wis.

Educational — Vincent Sheehan, 3035 W. Wisconsin Ave., Apt. 401, Milwaukee, Wis.

Registration—Dexter Rhodes, 3912 W. Villard Ave., Milwaukee, Wis.

Banquet—Frank J. Marx, 1431 Cherry St., Milwaukee, Wis.

Transportation — Joseph Bykowski, 2762 N. Sherman Blvd., Milwaukee, Wis.

Exhibits — Henry Bornitzke, 2602 N. 50th St., Milwaukee, Wis.

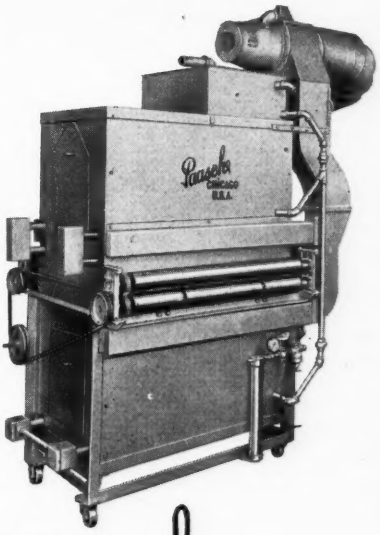
Advisory—Dan Wittig, 1221 N. 3rd St., Milwaukee, Wis.

R. L. Hamilton Appointed Sales Manager of Dumore Company

The board of directors of The Dumore Company, Racine, Wis., has appointed Robert L. Hamilton as sales manager of the company. In his new capacity, Mr. Hamilton will fill the vacancy caused by the resignation of Leland B. Augustine, who has been sales manager for the last few years. Mr. Augustine will now take personal charge of Dumore sales in the Chicago territory.

Mr. R. L. Hamilton.

Mr. Hamilton became advertising manager for The Dumore Company shortly after his graduation in 1934



Again Paasche Solves A Difficult Coating Problem

To protect a lithographed finish on sheet metal to be formed, it is necessary to lubricate the sheet or the die—

—Paraffin is an ideal lubricant but difficult to apply uniformly, in a barely discernible coat.

Paasche Engineers solved this problem with the above **Portable Automatic Conveyor Unit.** It coats 70 sheets (size 36"x29") a minute—both sides. All spoilage has been eliminated.

Our engineers will be pleased to show you short cuts to lowered costs and savings in material.

Guaranteed Savings FINISH WITH AIR Paasche

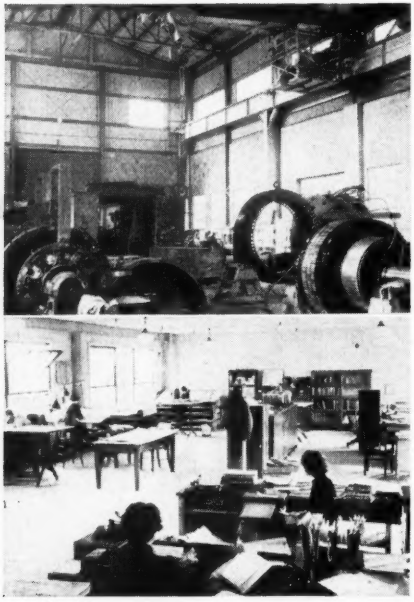
Send sample of your product—tell us production desired—No obligation.

Paasche Airbrush Co.
1910 Diversey Parkway
Chicago, Illinois

from the college of commerce of the University of Notre Dame. In 1936 he was assigned to the new post of sales promotion manager.

New Additions Made to Hanson-Van Winkle-Munning Plant

A considerable expansion program has been undertaken by the Hanson-Van Winkle-Munning Company, Matawan, N.



(Above)—A section of the new drafting and engineering room recently built at the plant of the Hanson-Van Winkle-Munning Company. (Below)—The new addition to the electrical shop, showing a freight car in the loading position, the new 60-ton crane, and generators in the process of construction.

J., manufacturers of electroplating equipment and supplies. A new office building has been erected on Church Street, connected with the main office by a bridge. The additional space, which is approximately 2,000 sq. ft., is used as a drafting and engineering room.

The second expansion within two years has been added to the electrical shop. The additional space thus acquired is approximately 6,000 square feet. A new railroad spur has been built with sunken tracks so that the car floor is on the same level with a new concrete loading platform. A 60-ton crane has been erected for loading and unloading heavy equipment. A new electrical substation has been installed to take care of additional loads.

Klinkenstein Addresses Providence Electroplaters

An address on "Selecting the Correct Lacquer for the Job" was presented before the meeting of the Providence Branch of the American Society of Electroplaters, held at Providence on December 17, by Gustave Klinkenstein, vice-president and technical director, Maas & Waldstein Company, makers of industrial finishes, Newark, N. J.

Mr. Klinkenstein pointed out that the electroplating industry was confronted with as many finishing problems as any other industry, and that the makers of industrial finishes had devoted much research to the solution of these problems. He discussed the large number of special finishes that have been developed in the past few years and stated that the selection of the most suitable finish for a given job had now become the work of an expert.

Maas & Waldstein Exhibit at Heating and Ventilating Show

"Finishes engineered to the job" were exhibited by Maas & Waldstein Company, 438 Riverside Ave., Newark, N. J., manufacturers of industrial finishes, at the International Heating and Ventilating Exposition, which was held in New York City in January.

The exhibit included air-conditioning units, oil heater jackets, and oil burners finished with M & W finishes specially designed to withstand the service conditions to which each of these products is subjected. Stress was laid on the parts emphasized by good design, color, quality of finish, and wearing qualities in increasing manufacturers' sales. Mr. B. D. Sanderson, sales manager of the company, was in charge of the M & W booth.

R. H. Alden Appointed Sales Manager of J. J. Siefen Company

The J. J. Siefen Company, 1936 W. Lafayette Blvd., Detroit, Mich., announces the appointment of Mr. R. H. Alden as sales manager. This appoint-

ment is effective after February 1. The company also announces that Mr. E. H. Mead and Mr. L. I. Schreck have joined the company.

The Gehnrich Corporation Appoints Representative in Michigan

The Gehnrich Corporation, Skillman Ave. and 35th St., Long Island City, N. Y., has announced the appointment of Mr. Frank L. Neward, 608 Marquette Bldg., Detroit, Mich., as representative in Michigan. Mr. Neward is equipped to engineer and make recommendations with regard to industrial oven and dryer problems in metal finishing or baking and kindred operations.

DeVilbiss Company Announces Training School Schedule

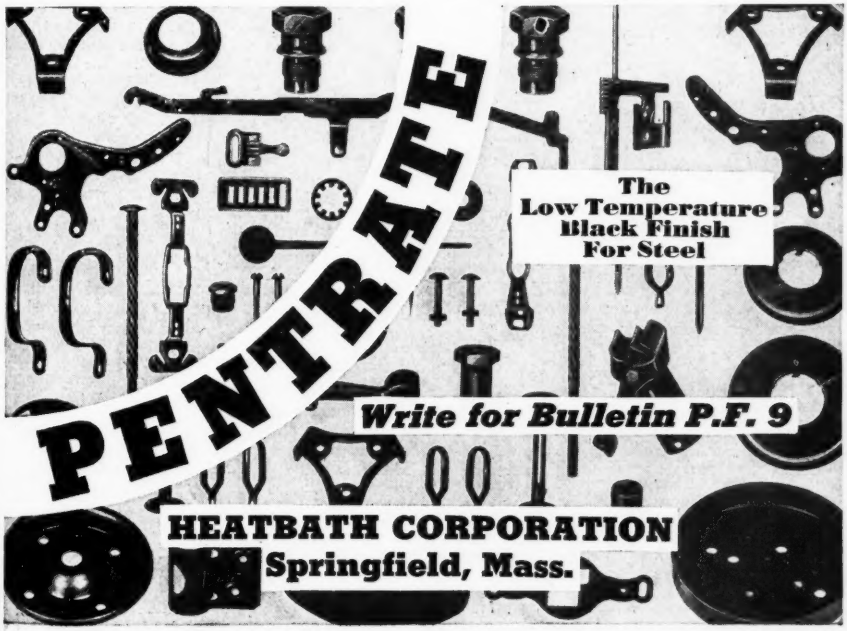
The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio, has announced the schedule of its training school for the first half of 1938. This school is open to industrial painters, master painters, automobile refinishers, and all others interested in learning the technique of spray-painting and the use and care of spray-painting equipment.

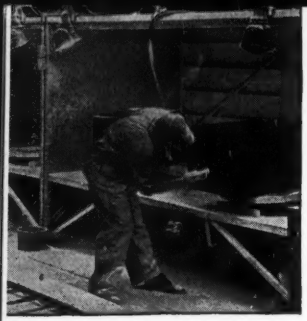
The training period lasts for one week. Classes will start on the following dates: February 7, March 7, April 4, May 9 and June 6. Special rates in Toledo hotels and boarding houses near the plant have been secured for men attending the school. It is advisable to enroll in the school as far in advance as possible, since the size of the classes must be limited and since there will be no training periods other than those announced.

Foote Bros. Appoint Representative

Foote Bros. Gear and Machine Corp., 5301 S. Western Ave., Chicago, Ill., has recently announced the appointment of Mr. Walter A. Hoppe, 948 S. Grand Ave., Los Angeles, Calif., as representative in the southern part of California. Mr. Hoppe is a mechanical engineer with a background of 17 years experience in the power transmission equipment field.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.





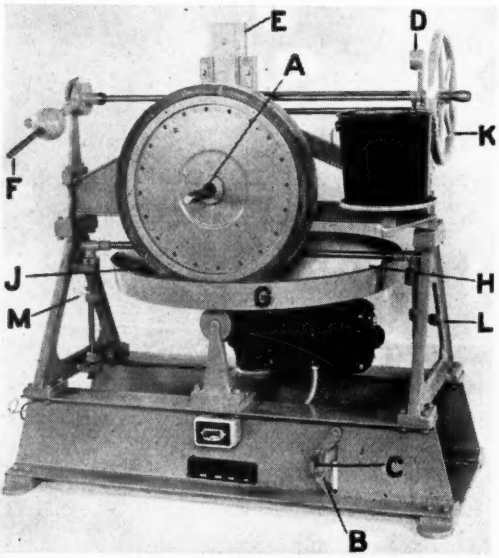
NEW
Plant Equipment & Materials

Scovil Polishing Wheel Heading Machine

A machine that is said to provide the means for better polishing is the Scovil Polishing Wheel Heading Machine which is being distributed by Divine Brothers Company, Utica, New York. This machine is said to save time, labor and polishing grain. Polishing wheels coated on this machine are said to have an even coat of abrasive because the coat has been applied so rapidly that the adhesive has had no time to partially set. An even and regulated pressure is possible in rolling the wheel in the abrasive.

In the illustration, A shows the spindle on which the polishing wheel is located for the heading operation. The wheel that is being coated is 20 inches in diameter. A foot treadle B provides the means for projecting forward a cover plate which covers the abrasive pan and prevents any glue or cement from accidentally dropping into the abrasive pan beneath the wheel. After the operator has brushed on the glue or cement, the latch C can be kicked out and the cover plate returns to its back position.

After the glue or cement has been applied, the wheel is lowered into the moving abrasive pan G by pushing back pawl lever D. If more pressure is desired than that furnished by the weight of the wheel and a slide E, a weight lever F can be pulled forward. The lever F acts through a rack and pinion on the back of the slide E and thus exerts extra pressure.



Scovil Polishing Wheel Heading Machine.

Lever F is graduated so that the amount of pressure is not left to guesswork. The abrasive pan G revolves at the rate of 24 R.P.M., consequently in less than three seconds the wheel is completely coated. The abrasive in pan G is maintained in a smooth, level condition, by the scrapers J and H.

Scraper J is set a little higher than scraper H so when scraper J ceases to back up grain, the operator knows that more grain is needed in the pan. After the wheel has been coated with abrasive, lever F is lifted into its upright position, pawl lever D is pulled forward and the wheel is lifted out of the pan by the revolving hand wheel K. Pan G is removed by turning handles L and M into position and lifting out the pan. Where more than one grain is used, a separate pan and cover for each size is available. By keeping each size grain in its own pan the danger of mixing grains is said to be eliminated. Chang-

ing pans requires but a few seconds. If it is desirable to use the machine for rolling in the grain only, the glue pot stand and the cover plate and its operating mechanism can be omitted.

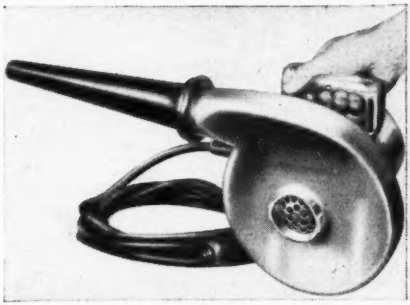
The type of machine illustrated will accommodate wheels of from 8 in. to 20 in. in diameter and up to 6 in. face, straight, concave, convex, or grooved.

The power equipment supplied consists of a 1/3 H.P. A.C. repulsion induction motor 110-220 volts, 60 cycle, single phase, driving through a bronze reduction gear running in oil. All bearings are either roller or ball.

Included as standard equipment is one abrasive pan, one cover, three disks (to take care of various diameter wheels), one 1½ in. spindle bushing, and two extra scrapers. The net weight of the machine is 500 pounds.

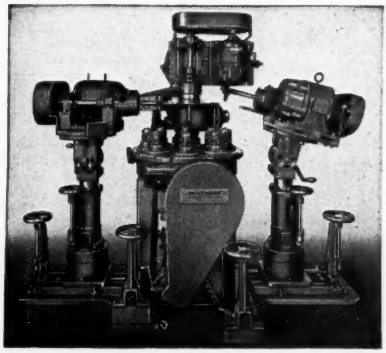
Improved "Tornado" Portable Electric Blower

The Breuer Electric Manufacturing Company, 852 Blackhawk St., Chicago, Ill., announces several changes and improvements in the "Tornado" Portable Electric Blower. The life of the motor is potentially increased through a new type of bearing construction. Miner's gauze has been placed over the intake holes in the housing to prevent damage to the motor when used under excessive dust and dirt conditions.



Improved "Tornado" Portable Electric Blower.

The added improvements, together with the many features already contained in these units, are said to make the Breuer line of portable blowers and cleaners highly efficient for the removal of dust and dirt from motors, machinery and processes in industry.



SAVE MONEY
ON YOUR FINISHING
POLISH AND BUFF
- Automatically -

3 Types—Rotary (shown)
Straight Line Conveyor and Portable Vertical
for all Shapes and Sizes of Products.

WRITE DEPT. "F" FOR CATALOG.

PACKER
Automatic
POLISHING & BUFFING MACHINES
THE PACKER MACHINE CO. MERIDEN, CONN.

Stanley Air Drying Aluminum Synthetic

The Stanley Chemical Co., East Berlin, Conn., has announced a new Air Drying Aluminum Synthetic which is said to be tack free in 20 minutes. This new material is designated as No. 66E-656 Aluminum Synthetic. It is said to have exceptional brilliance and excellent adhesion, durability and weathering qualities.

No. 66E-656 has what is said to be phenomenal flow and dipping characteristics and imparts a bright, smooth finish in a one-coat job. The coating is free from sags, runs, or drips. On dip application, the material should be used without reduction, while for spray application it should be thinned to meet the specific requirements. The Air Drying Aluminum Synthetic material does not settle out and only normal stirring is required before use.

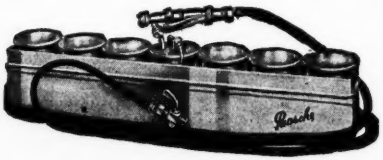
No. 66E-656 has been used successfully on such items as sled runners, juvenile toys and playground equipment. Production schedules are said to be materially increased, since long baking at extreme temperature is unnecessary with this air drying material.

MATCHLESS UNIFORMITY
THE WORLD'S PEMCO FINEST
THE PORCELAIN ENAMEL & MFG. CO.
PEMCO and EASTERN AVES., BALTIMORE, MD.

Keeping pace with modern manufacturing
STREAMLINED
DUST REMOVAL SYSTEMS
..Have More Suction at Machines.
... for Grinding Polishing, Buffing Machines. Fume and Ventilating Systems
YOUNG AND BERTKE COMPANY
4 HULBERT AVE. CINCINNATI, O.

Paasche Type F839 Touch-Up Unit

A touch-up unit, designated as the "Type F839", is being marketed by Paasche Airbrush Co., 1910 Diversey Parkway, Chicago, Illinois. This Touch-Up Unit is compact and is said to be ideal for delicate shading, retouching, and spotting. The unit is complete and ready to attach to air supply and may be carried about from job to job.



Paasche Type F839 Touch-Up Unit

All coating materials such as enamels, paints, lacquers, synthetics and so on may be applied light or heavy as desired.

The Type UATRF2 airbrush used in

CHROMIUM PLATING
SCREWS—RIVETS—WASHERS—NUTS—EYELETS
SMALL STAMPINGS—TURNINGS—WIRE GOODS
ROLLED AND POLISHED FINISHES
Send Samples for Estimates
THE CHROMIUM PROCESS CO., Center St., Derby, Conn.

connection with the Touch-Up Unit has a graduated round and fan spray nozzle head which is said to provide the smallest round spray up to the widest fan spray simply by turning the head. A three position operating lever—thumb action, finger action or hand action—is an added feature of this Touch-Up Unit. The airbrush is light and easy to operate and requires only 2 to 3 cubic feet free air per minute at pressures of 25 lbs. upward.

Platers Research Control System

Platers Research Company, 74 Grand Ave., Brooklyn, N. Y., has improved a control system which has been operating successfully for over eight years, and is offering this system for approximately one-half the former cost. As an introductory offer, this firm is giving away free all apparatus and glassware comprising the control sets with the purchase of the necessary chemicals.

The apparatus given away free consists of two 50 c.c. funnel-top burettes, one 10 c.c. automatic pipette, one burette stand, two burette clamps, one 100 ml. graduate, one 250 c.c. beaker, one Erlenmeyer flask, one sampling tube, one brass tube for burette stand, one tube of stopcock grease, and one log book containing complete directions and forms for making and recording tests. No knowledge of chemistry is necessary to operate the sets. All calculations and quantities of chemicals necessary to correct the solution are worked out and included with the sets.

Auto-Solv D'Oiler

A strictly automatic solvent degreasing machine in which the small parts to

If you have a finishing problem of unusual difficulty

If you are interested in checking your present schedule for economy

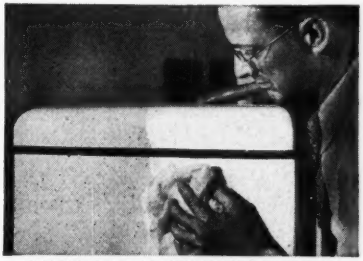
If you are merely curious as to what we have to offer

WRITE

The Varnish Products Co.

5208 Harvard Ave. Cleveland, Ohio

Clear Lacquers—Etching Lacquers—Heatproof White—Bronzing Vehicles—R-700—CEL-U-LAK Primers and Surfacers—Lacquer Enamels — Lacquer Cements — SPECIALTIES.



"MAGIC" TACK RAGS IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.

4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.

If your dealer does not carry Magic Tack Rags, write us for sample.

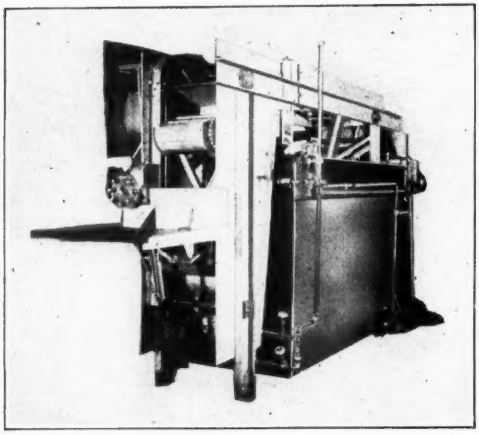
Borolon

TRADE MARK

Strictly first-quality aluminum oxide abrasive polishing grain manufactured in our own electric furnace plant under highest standards of quality and uniformity. Write for samples.

ABRASIVE COMPANY

Grinding Wheel and Abrasive Division of Simonds Saw and Steel Co., TACONY and FRALEY STS., PHILADELPHIA, PA.



Auto-Solv D'Oiler

be cleaned are hopper fed to a traveling scroll conveyor bucket, to be known as "Auto-Solv", has been placed on the market by Mechanical Process Corporation, South Orange, New Jersey. As the scroll conveyor bucket passes through the various baths, it revolves and tumbles the work, separates it and gives it a thorough washing. As the work passes through the last bath, it is revolved slowly to remove entrapped solvent and is cooled off slightly before it is dumped into the chute and passes out to the basket.

In the Auto-Solv, the baths are arranged one above the other to save floor space and make for compactness in the design. The method used is the counterflow type in which the pure or clear solvent is the final rinse and the first bath is the dirty rinse. In this way, as the solvent becomes contaminated it is automatically replenished by clean solvent by the overflow from the following bath. As the solvent flows from one bath to the next the oil content becomes greater and finally in the lowest bath or the oil concentrator it is pumped through a filter to a special still incorporated in the machine. Here the oil and solvent are separated, the solvent vaporized and

"NO-TARNISH"

#21 Brass | #22 Silver | #23 Copper

Durable clear finish for polished metals.
In use nationally for 20 years.
SPECIFY IT FOR OUTSIDE USE
Samples on Request

CLEAVELAND
LABORATORIES & MFG. CO., Inc.
447 Wilson Ave., Newark, N. J.

SMOOTHER SPRAY

—and smoother work, smoother production, with the Milburn paint spray gun. Wide, wet spray — easily adjusted.

WRITE FOR NEW CATALOG

The ALEXANDER MILBURN Co.
1436 W. Baltimore St.
Baltimore, Maryland

UNIFORM ELECTRODEPOSITS

Use Harshaw Anodes and Chemicals for uniform plating of Nickel, Copper, Chromium, Cadmium, Tin, Zinc and other kinds of plating.

THE HARSHAW CHEMICAL CO.
Manufacturers, Importers, Merchants.
Offices and Laboratories: Cleveland, Ohio.
Branch offices in principal cities.

condensed to pure solvent and the oil and grease drained off through a U seal at the side of the machine.

The scroll type bucket or basket used in the Auto-Solv makes it possible to charge or load the bucket while it is moving. As it passes by the chute, mouth up, a valve opens and drops a measured load into the basket from the loading platform. Where agitation or tumbling of the work is desired, a sprocket on the bucket engages a rack causing the bucket to revolve, thus agitating the work in the solution and tumbling it gently to separate the parts so that the solvent can reach the entire surface. When the bucket passes over the dump hopper the rack is on the opposite side of the sprocket and the bucket revolves once in the opposite direction, dumps all the work into the hopper where it slides down a chute and discharges into a waiting tote pan.

The solvent used in the Auto-Solv is known as the D'Oilene. It is boiled in the lowest tray and vapor rising from this compartment envelopes all the rinse trays and rises in the machine to a thermostatic element which actuates a valve controlling the condensing water flow through the condensing coils on which this vapor is condensed. The distillate is caught in a separate compartment from which it is pumped to the hopper or clean rinse bath, insuring an ample supply of pure solvent for the last and final cleaning. The dirty solvent in the oil concentrator is pumped through a filter and over the still in one end of the machine.

In the construction of the Auto-Solv, every precaution has been taken to conserve solvent, steam, and water, and to prevent corrosion by use of selected bearings, galvanizing, and alloy metals.

ATTENTION

Manufacturers of Caskets, Commercial Bodies, Display Equipment, Washing Machines, Trailers, Air Conditioning Equipment, Stoker, Water Coolers, etc.

METALPREP

Metal Cleaner

INSURES

1. Perfect bond between metal and prime.
2. Removal of grease and oil film.
3. Removal of rust.
4. Destruction of rusting agents.
5. Safe metal surface for paint.

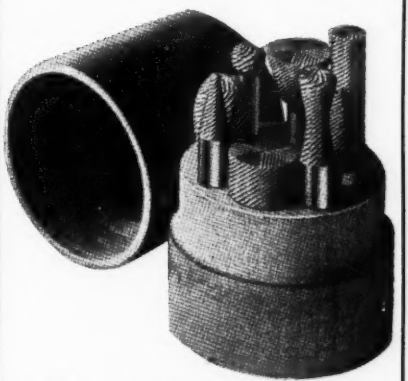
USED FIRST — MAKES YOUR PAINT FINISH LAST

Write for "Metal Cleaning Hints" Bulletin

NEILSON CHEMICAL CO.

6564 BENSON ST. DETROIT, MICH.
TECUMSEH RD. WINDSOR, CANADA

ROTARY FILES



They Cut Faster—Last Longer

Ford Hand Cut Rotary Files are made of high Speed Steel. Write for information and prices.

M. A. FORD MFG. CO.

417 Pershing Ave. Davenport, Iowa

SAWTOOTH CHROME ANODES

10 EDGES FOR THROWING POWER

EXTRUDED LEAD

3082 W. 106th ST.

HEIL & CO.

AT PLAIN ANODE PRICES

WRITE FOR NEW BULLETIN ON ANODES

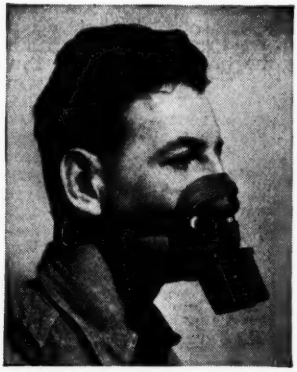
CLEVELAND, OHIO

The Auto-Solv illustrated herewith is 15 ft. long, 8 ft. high, and 3 ft. wide. The perforated baskets are 8 in number, 10 in. by 16 in. long, and each holds 15 lbs. of small parts such as screws, nuts, and buttons, and so on. The unit is heated with a 5 H.P. Mears-Kane-Ofeldt automatic gas boiler at 25 lbs. steam pressure. The condensing water is thermostatically controlled so that only enough water is used to condense the required solvent. The machine holds 135 gallons of solvent and with 8 buckets will clean 2,500 lbs. of work an hour.

The heated portions of the unit are heavily constructed, galvanized inside, completely hooded and insulated. Arrangement of the coils is said to prevent accumulation of moisture in the solvent from the atmosphere. The buckets are automatically loaded and unloaded and the work may be tumbled and agitated.

Dustfoe Respirator

A newly developed respirator, weighing less than 3¼ ounces in weight and providing full protection with utmost comfort under severe working conditions, to be known as the "Dustfoe Respirator", has just been placed on the



Dustfoe Respirator.

market by the Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.

The Dustfoe Respirator permits full vision in any direction and does not interfere with the wearing of goggles, spectacles, welding helmets or head coverings of any kind and may be worn for long working periods with complete comfort.

SEVERANCE MIDGET MILLING CUTTERS
Large stock of Standard cutters. Any shape, any size—custom made for burring, countersinking, taper-reaming, tube burring and facing, ball socket reaming, tripanning, etc. Submit your problem to our engineers. **CATALOGUE ON REQUEST.**

Severance Tool Mfg. Co.
1518 E. Genesee Ave., Saginaw, Michigan

SERVICE-BUILT BUFFS

You get from 25 percent to 50 percent more service in this type buff than from the average. This is a "formed" buff—cloth is not cut like the conventional buff, but formed so that there are no loose threads while in use, and every thread in each ply comes in contact with the work. Slow wearing. Uniform. Workmanship—the best. Don't doubt these facts. Prove this buff out in your polishing department. We always stand back of our claims.

BIAS BUFF & WHEEL CO. INC.
430 Communipaw Ave. Jersey City, N. J.

All metal parts are made of aluminum, are quickly replaced, and may be thoroughly sterilized at any time, including the soft rubber face-cushion.

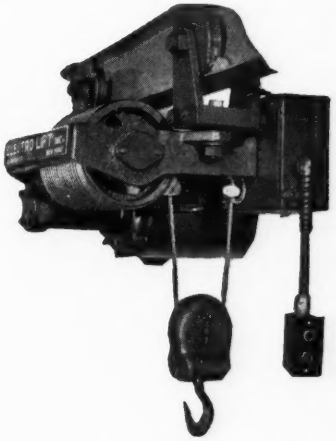
The Dustfoe filter is said to eliminate dust particles as small as one micron in size with highest efficiency and unnoticeable breathing resistance. Replacement of filters is said to be simple and require but a few seconds. Low-cost cellulose filters assure economical maintenance.

Electro Lift Rope Guide Hoist

The Rope Guide Hoist, built by Electro Lift, Inc., 30 Church St., New York City, and illustrated herewith, has been designed especially for side and end pulling or wherever the loads cannot be brought directly under the hoist.

This hoist has a drum with deep grooving allowing the cable to be completely submerged within the grooves. It is fitted with a traveling guide having a finger which runs in the groove ahead of the cable and which holds the cable in its proper groove.

The Electro Lift Rope Guide Hoist eliminates the hazard of crossed or piled up cables thus increasing the cable life and reducing cable breakage particularly where loads are pulled at an angle to the vertical.



Electro Lift Rope Guide Hoist.

This hoist is built in sizes of ¼ to

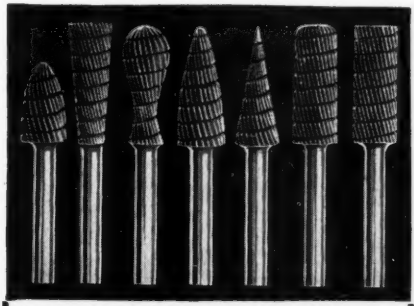
Is your
Dust Removal System
100% Efficient?

Have you had any trouble lately with your dust removal system? Let us study your problems and submit recommendations on modernizing your present system. Absolutely no obligation.

Information and prices on NEW systems on request. Write today.

Builders of all types of Dust and Fumes Removal Systems, Ventilating Systems, Spray Booths and Drying Ovens.

GEO. KOCH SONS
EVANSVILLE • INDIANA



HAMILTON
MILL CUT ROTARY FILES

Eighteen standard shapes and sizes made up in five different cuts. Adaptable for all classes of work and for all kinds of materials. Try them on your next job.

We maintain a complete service for making special files. Write for circular and price list.

THE HAMILTON TOOL CO.
HAMILTON • OHIO

5-tons, and has all the speeds and ratings of standard Electro Lift Hoists. It has worm drive with worm and wheel running on Timken tapered roller bearings, fully enclosed within the gear case and running in a bath of oil. This provides simple construction and quiet operation. The motor has ball bearings and is directly attached to the hoist frame giving compact arrangement. The entire load is carried on a rigid cast steel frame.

The hoist has close headroom allowing the hood to reach within a minimum distance of the overhead track. It has a safety type hook block with a guard which completely encloses the bottom sheave. It is built in both Single and Twin Hook types, the latter for handling long loads. The control may be either rope type or push button type, the latter giving accurate control of the load by jogging. Top and bottom limit switches may also be provided to stop the load in each direction of travel, preventing running the cable off the drum and providing an accurate stop at the bottom as well as at the top.

Daniels Electroplating Machines

A line of electroplating machines has been developed by the Daniels Plating Machine Company, Inc., 127 Oliver St., Newark, N. J., designed for plating small articles. These machines consist of steel tanks, rubber lined for containing the solution, anodes, rods and connections. A perforated insulated cylinder with negative and insulated conductors hold the articles to be plated. A tilting lever, gear housing, oil reservoir and drive pulley are also provided. These machines can be arranged for belt or motor drive as desired.

The frame of the Daniels Electroplating Machine has a 4-point contact so placed in the bottom of the container that the current is equally distributed to all articles being plated. This is said to result in uniform deposition, eliminating the deposit or "treeing" of metal on any part of the machine itself.

Check in DeWITT OPERATED HOTELS
Genuinely Friendly
In CLEVELAND it's
√ The HOLLENDEN
In COLUMBUS it's
√ The NEIL HOUSE
In AKRON it's
√ The MAYFLOWER
In TOLEDO it's
√ The NEW SECOR
In JAMESTOWN, N. Y., it's
√ The Jamestown and
√ The SAMUELS

Beaverbright Fibre Meals

Vegetable fibre meals that are said to contain no acid, grit, pitch, gum or abrasive material that might mar the work in process and which can be used where sawdusts were formerly used have been placed on the market by H. Leroy Beaver, Lansdale, Pa. Four varieties, designated as A, B, C, and D, are available. All four varieties are sterilized, steamed, compressed, kiln dried and then hammer milled into the right consistency for either drying out or polishing or both after the barrel burnishing process.

The meal designated as A is an almost pure cellulose fibre product composed of the processed bagasse of sugar canes. This fibre meal is said to absorb 340 to 350 pounds of water per 1,000 pounds of material. Its function is principally as a drying out medium. Meal A is 16 screened, but can also be supplied in flour form.

The meal designated as B is composed of treated cobs of Argentine eight row flint corn. It is said to be harder than the ordinary maple sawdust and will absorb 210 pounds of water per 100 pounds of material. A feature of meal B is hardness, consequently it is recommended for dry polishing after barrel burnishing. Meal B is also said to lend itself admirably to combinations of dry abrasives for dry burnishing work.

The meal designated as C is a combination of equal parts of A and B and is said to function as a combined drying out and polishing medium. This combination of fibres is said to have an absorption equivalent of 285 pounds of water to 100 pounds of dry material, and repeated tests have shown its

marked efficiency for barrel finishing operations.

The meal designated as D is composed of Argentine white maize fibre which is processed by steaming and exploding Argentine flint corn, then compressing and kiln drying the fibre after which it is hammer milled into a semi-coarse fibrous material. This variety is intended specifically for blending with soft polishing abrasives such as vienna lime, crocus, rouge, diatomaceous earth or talc for deburring or dry treatment of light gauge materials or plastics.

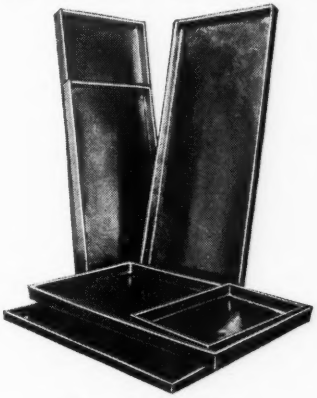
All Beaverbright Fibre Meals are packaged in double thick rope jute sacks, 6 in. x 13 in. x 29 in. in size and each sack contains an approximate average of 2250 cubic inches of material.

Samples of Beaverbright Fibre Meals can be obtained by writing Mr. H. Leroy Beaver, Lansdale, Pa.

Haveg Drying Trays

In the illustration herewith is a group of Haveg Drying Trays which have now been placed on the market by Haveg Corporation, Newark, Delaware. This type of drying tray is said to be a new standard item and is available in practically any size as standard.

Haveg Drying Trays are said to provide excellent service for the drying of dyes, acid reagents, and similar products. Crystals separate easily from the trays



Haveg Drying Trays.

and the low coefficient of heat transfer of Haveg facilitates even drying. The trays can be used at temperatures up to 265 deg. F. without fear of damage.

IN PHILADELPHIA IT'S THE
HOTEL PHILADELPHIAN
39th and Chestnut Streets
Philadelphia, Pa.
Conveniently located to all Stations, and only five minutes from the heart of the business section.
★
600 ROOMS
600 BATHS
★
Room with Bath from $2.75 up

INDEX TO ADVERTISEMENTS

Abrasive Company 57
Alrose Chemical Company ..... Second Cover
American Air Filter Co., Inc. 25
Angle Steel Stool Company 43
Ault & Wiborg Corporation 21
Barlum Hotel 63
Bias Buff & Wheel Co., Inc. 60
Carborundum Company, The 3
Chromium Process Company, The 56
Cleaveland Laboratories & Mfg. Co., Inc. 58
Delta Mfg. Co. 39
DeWitt Operated Hotels 62
Ford Mfg. Co., M. A. 59
General Abrasive Company, Inc. 6
Glidden Co., The 47
Hamilton Tool Co., The 61
Harshaw Chemical Co., The 58
Haveg Corporation 45
Heatbath Corporation 53
Heil & Co. 59
Hilo Varnish Corp. 33
Juergens Co., Wm. A. 57
Kirk & Blum Mfg. Co., The ..... Fourth Cover
Koch Sons, Inc., George 61
Maas & Waldstein Company 29
Milburn Company, The Alexander 58
Neilson Chemical Co., The 59
Norton Company 37
Oakite Products, Inc. 1
Paasche Airbrush Co. 51
Packer Machine Co., The 55
Parker Rust Proof Company 2
Pennsylvania Salt Manufacturing Co. 4
Philadelphian Hotel 63
Platers Research Company 41
Porcelain Enamel & Mfg. Co. 56
Ross Engineering Corp., J. O. ..... Third Cover
Severance Tool Mfg. Co. 60
Stanley Works 11
Udylite Company, The 17
Varnish Products Co., The 57
Young & Bertke Co. 56

PRODUCTS FINISHING
Published by GARDNER PUBLICATIONS, Inc.
431 MAIN STREET, CINCINNATI, OHIO